# HOTEL FIRE SAFETY: WHAT'S NEEDED TO PROTECT OUR CITIZENS AND FISCAL YEAR 1988 AUTHORIZATION FOR THE FEDERAL FIRE PREVENTION AND CONTROL ACT

---

## HEARING

BEFORE THE

SUBCOMMITTEE ON
SCIENCE, RESEARCH AND TECHNOLOGY

OF THE

COMMITTEE ON
SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

FIRST SESSION

MARCH 5, 1987

[No. 16]

Printed for the use of the
Committee on Science, Space, and Technology

U.S. GOVERNMENT PRINTING OFFICE
74-253 WASHINGTON : 1987

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

H701-62

## COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

ROBERT A. ROE, New Jersey, *Chairman*

GEORGE E. BROWN, Jr., California
JAMES H. SCHEUER, New York
MARILYN LLOYD, Tennessee
DOUG WALGREN, Pennsylvania
DAN GLICKMAN, Kansas
HAROLD L. VOLKMER, Missouri
BILL NELSON, Florida
RALPH M. HALL, Texas
DAVE McCURDY, Oklahoma
NORMAN Y. MINETA, California
BUDDY MacKAY, Florida
TIM VALENTINE, North Carolina
ROBERT G. TORRICELLI, New Jersey
RICK BOUCHER, Virginia
TERRY BRUCE, Illinois
RICHARD H. STALLINGS, Idaho
BART GORDON, Tennessee **
JAMES A. TRAFICANT, Jr., Ohio
JIM CHAPMAN, Texas
LEE H. HAMILTON, Indiana
HENRY J. NOWAK, New York
CARL C. PERKINS, Kentucky
TOM McMILLEN, Maryland
DAVID E. PRICE, North Carolina
DAVID R. NAGLE, Iowa
JIMMY HAYES, Louisiana
DAVID E. SKAGGS, Colorado ***

MANUEL LUJAN, Jr., New Mexico *
ROBERT S. WALKER, Pennsylvania
F. JAMES SENSENBRENNER, Jr., Wisconsin
CLAUDINE SCHNEIDER, Rhode Island
SHERWOOD L. BOEHLERT, New York
TOM LEWIS, Florida
DON RITTER, Pennsylvania
SID W. MORRISON, Washington
RON PACKARD, California
ROBERT C. SMITH, New Hampshire
PAUL B. HENRY, Michigan
HARRIS W. FAWELL, Illinois
D. FRENCH SLAUGHTER, Jr., Virginia
LAMAR SMITH, Texas
ERNEST L. KONNYU, California
JACK BUECHNER, Missouri
JOEL HEFLEY, Colorado
CONSTANCE A. MORELLA, Maryland

Harold P. Hanson, *Executive Director*
Robert C. Ketcham, *General Counsel*
Regina A. Snyder, *Chief Clerk*
R. Thomas Weimer, *Republican Staff Director*

## Subcommittee on Science, Research and Technology

DOUG WALGREN, Pennsylvania, *Chairman*

BUDDY MacKAY, Florida
LEE H. HAMILTON, Indiana
HENRY J. NOWAK, New York
DAVID E. PRICE, North Carolina
GEORGE E. BROWN, Jr., California
NORMAN Y. MINETA, California
TERRY BRUCE, Illinois
CARL C. PERKINS, Kentucky
DAVID R. NAGLE, Iowa
JIMMY HAYES, Louisiana
TIM VALENTINE, North Carolina
JIM CHAPMAN, Texas

SHERWOOD L. BOEHLERT, New York
PAUL HENRY, Michigan
CLAUDINE SCHNEIDER, Rhode Island
DON RITTER, Pennsylvania
SID W. MORRISON, Washington
D. FRENCH SLAUGHTER, Jr., Virginia
LAMAR SMITH, Texas
JACK BUECHNER, Missouri

---

* Ranking Republican Member.
** Resigned February 19, 1987 (H. Res. 89).
*** Elected March 30, 1987 (H. Res. 133).

# CONTENTS

## WITNESSES

### PANEL I

March 5, 1987: Page
Jack E. Snell, Director, Center for Fire Research, National Engineering Laboratory, National Bureau of Standards; Clyde A. Bragdon, Jr., Administrator, U.S. Fire Administration, Federal Emergency Management Agency; and William M. Neville, Jr., Superintendent, National Fire Academy, Federal Emergency Management Agency ..... 4

### PANEL II

John C. Gerard, Washington representative, National Fire Protection Association, accompanied by Thomas J. Klem, director, fire investigations and applied research, National Fire Protection Association; James K. Lathrop, life safety code specialist, engineering services division, National Fire Protection Association; and Robert V. Miller, fire code coordinator, Western Fire Chiefs Association, Inc ..... 108

### PANEL III

John Senson "Sunny" Scarff III, director, fire protection, Marriott Corp.; Bill Gunter, fire marshal, State of Florida, accompanied by Buddy De War, director, Florida State Fire Marshal's Office; and Elmer F. Chapman, deputy fire chief, retired New York City Fire Department ..... 145

## APPENDIXES

Appendix I.—Commission on Fire Safety Report to the Governor, Commonwealth of Puerto Rico, March 1987 (Dupont Plaza Hotel) ..... 177
Appendix II.—Additional fact sheets and letters for the record ..... 266

# HOTEL FIRE SAFETY: WHAT'S NEEDED TO PROTECT OUR CITIZENS AND FISCAL YEAR 1988 AUTHORIZATION FOR THE FEDERAL FIRE PREVENTION AND CONTROL ACT

---

THURSDAY, MARCH 5, 1987

House of Representatives,
Committee on Science, Space, and Technology,
Subcommittee on Science, Research and Technology,
*Washington, DC.*

The subcommittee met, pursuant to notice, at 9:55 a.m., in room 2318, Rayburn House Office Building, Hon. Doug Walgren (chairman of the subcommittee) presiding.

Staff present: David Goldston, professional staff member; Carrye Brown, professional staff member.

Mr. Walgren. I apologize for the delay. We have been waiting for the ranking minority member, Mr. Boehlert from New York, who many of you know. Mr. Boehlert has a deep interest in fire. He comes from a background as a county executive in upstate New York and was very involved in the fire protection efforts there and has brought that same interest to this committee. He is one who would want me to express his apologies and he will be here, I'm sure, as soon as he possibly can.

I want to welcome you to this hearing on the fiscal 1988 authorization of the Federal Fire Prevention and Control Act and also the exploration that we can make in the context of these hearings on hotel fire safety.

The recent DuPont Plaza fire in Puerto Rico where 96 people lost their lives is something that impels us to do everything we can in every forum and every level of our Government to increase fire safety for the public as a whole.

It would be one thing if this were an individual isolated incident but it's not. Fire tragedies in hotels and high rise buildings are all too frequent, when you think that the MGM Grand Hotel fire in Las Vegas, the Stouffer's in Harrison, N.Y., the Las Vegas Hilton, again in Las Vegas, the Inn on the Park near Toronto. All those fires occurred within a four month period and we lost 125 people in the worse way.

Yet, we are swept along by our day to day lives and soon it seems like those events are not really at the forefront of our mind but they should be.

I'm often reminded in this area about the more things change, the more they remain the same. Here is a bill, H.R. 1891, that was introduced in 1947 by a Congressman by the name of Camp. It was to establish standards for the construction of hotels and materials used in hotels, the very thing that we still grapple with today and our failure to results in people being literally killed today.

We have got to do better and certainly we on this committee and together with those of you in the audience that are particularly involved in this area, I know if we pull together we can make some very concrete progress.

We want to look at the use of automatic sprinklers and other safety measures currently in effect in hotels. We know that research has improved the performance and reduced the cost of sprinkler systems and yet, in the newspaper following the Puerto Rican fire, the most striking fact was that 95 percent of the hotels in this country do not have sprinkler systems. That is a shame of the worst order.

DuPont Plaza did not have a sprinkler system or a fire detector system, and when we woke up to that fact, our reaction was, my gosh, I thought they all had them. We even think that it's one of our rights as individuals to travel in this country and to know that we are going to be protected in the common sense way and yet 95 percent of the hotels in this country do not have sprinkler systems.

We also want to look at the fire regulations in this country. The fire experts say that the DuPont Plaza tragedy could be repeated because fire safety regulations are literally a helter-skelter patchwork in this country. If that's true, you have to wonder whether there is really anything new to be learned by that event, other than it keeps happening, because rather than new lessons, the old one stares us right in the face, the need to apply what we already know and what we already can do.

We have as witnesses, fire experts from the Federal Government and from the private sector and from State government.

This committee authorizes three Federal agencies that are involved in this area, the Center for Fire Research under the National Bureau of Standards; the U.S. Fire Administration and the National Fire Academy, related to the Federal Emergency Management Agency. All three have been involved in the investigation of this fire and all three are on the Commission appointed by the Governor of Puerto Rico to draw up fire safety recommendations, but for so many families, the horse is already out of the barn.

These agencies on a Federal level have been targeted by the current administration repeatedly for either severe reduction or wholesale elimination. The fiscal year 1988 budget proposal is no different and we want to look and try to assess the impact that this kind of reduction will have on the ability of States and local governments to solve their fire problems and reduce the risk of fire.

We all know that in 1974, there was a Federal Commission that laid out a charter and the charter was that there ought to be a strong Federal fire effort and that Commission, which was a bipartisan Commission, with really no dissent within it, laid out a charter of Federal involvement that could be measured in effort in terms of dollars and that's what the dollars do on the Federal level, they measure effort at an annual expenditure of $150 million a year, asked for by a bipartisan Presidential commission in 1974.

We have maxed out at somewhere in the range of $20 million a year in our overall efforts and in these years of reduced budgets, not even that.

Now you have to wonder where philosophy comes into this. The truth of it is that although the Federal effort may not be in the philosophy of some people that are in a position to drive the Federal system, philosophy makes little difference to the families that now will and every day will wake up to someone not being there. When we read the papers, really the most important articles for all of us are the individual reports of people one by one, two by two, largely children or elderly that are lost day after day after day, and it shouldn't take this kind of a large tragedy for us to re-dedicate ourselves on the deepest level to trying to do the practical things together, regardless of philosophy, that will result in saving some of these lives.

Well, with that I would like to recognize the ranking minority member, Mr. Boehlert.

Mr. BOEHLERT. Thank you, Mr. Chairman. Thank you for an exceptionally strong opening statement and also for calling this hearing. Much of what we do in this committee and indeed in the entire Congress has only an indirect effect on the daily lives of most Americans.

Fire safety has a direct impact on all of us. It is literally a matter of life and death. The United States loses more lives and property to fire each year than any other developed country except Canada. That's a sorry record. The reason for this dismal record is quite simple. We refuse to learn.

It seems sometimes that the only thing separating any of us from a disastrous fire is pure luck. Federal investigators will tell us today that there were no new lessons to be learned from the DuPont Plaza fire. It followed a familiar pattern that can be run on a computer model. It just leaves you shaking your head and asking why, why did all these people have to die in a fire that we have known for years how to prevent.

Our job today is not to assess blame. That's a job for the courts. Our purpose is to look ahead. The question I'm going to be asking today is what can we do to make sure that the lessons of past fires are finally applied?

For starters, we ought to reject out of hand proposed cuts in Federal fire programs. These programs are responsible for the progress we've made in reducing fires over the past decade. The National Fire Academy, the Center for Fire Research, and the U.S. Fire Administration each provide unique information to help local fire fighters and code officials. Anything that reduces their services or the ability of fire fighters to take advantage of their services cannot be allowed, and I underscore that.

The nation's fire record is a graphic demonstration of how we are condemned when we fail to learn from the past. Until we learn, none of us are safe.

Thank you, Mr. Chairman.

Mr. WALGREN. Thank you, Mr. Boehlert.

Well, we have today several panels. The first being made up of Jack Snell, the Director of the Center for Fire Research at the National Bureau of Standards, along with Clyde Bragdon, the Administrator of the U.S. Fire Administration under the Federal Emergency Management Agency, and William Neville, superintendent of the National Fire Academy also within the Federal Emergency Management Agency.

Gentlemen, we appreciate your being here. Without objection, we will have permission for television cameras and other kinds of photographs and recordings that the media may want to take.

Mr. **Boehlert**. Mr. Chairman, may I ask a point of special privilege to welcome Mr. Neville. This is his first appearance before the committee. He is the new superintendent of the National Fire Academy. I want the superintendent to know that up here, from the chairman to all the minority members, you have our full support. Welcome.

Mr. **Walgren**. We appreciate your being here, gentlemen. Your written statements will be reproduced in the record that we make of this hearing and you please feel free to outline and emphasize and underscore those points that would best be communicated in this kind of a forum and that we need to focus on very directly.

So, let's go through the panel in that order and start with Jack Snell. Dr. Snell?

## STATEMENTS OF JACK E. SNELL, DIRECTOR, CENTER FOR FIRE RESEARCH, NATIONAL ENGINEERING LABORATORY, NATIONAL BUREAU OF STANDARDS; CLYDE A. BRAGDON, JR., ADMINISTRATOR, U.S. FIRE ADMINISTRATION, FEDERAL EMERGENCY MANAGEMENT AGENCY; AND WILLIAM M. NEVILLE, JR., SUPERINTENDENT, NATIONAL FIRE ACADEMY, FEDERAL EMERGENCY MANAGEMENT AGENCY

Mr. **Snell**. Thank you very much, Mr. Chairman. My name is Jack Snell. I'm Director of the Center for Fire Research of the National Bureau of Standards.

It's difficult to come and participate today in this discussion of another significant fire tragedy, difficult for the many reasons that you and Mr. Boehlert have just outlined. You both asked the question, why? It seems to me that among the reasons, among the answers, are two important reasons and these represent the crux of my informal remarks. I will submit the formal testimony for the record, as you suggest.

First of all, I believe people lack the tools they need to measure fire safety. For example, how can we tell how well a fire protection system or procedure will work if we don't have the means to measure its performance? Second, the second reason why, I think, is that people lack the education and motivation needed to give fire safety the appropriate priority in their lives.

One is not likely to avoid a danger he is not aware of or does not comprehend. I think it's as simple as that.

The measurement tools I would like to describe to you today can help open the public's mind to greater awareness to the hazards of fire and increase their motivation and ability to reduce fire risks and fire losses.

In making this point, I'd like to focus on the DuPont Plaza hotel fire. Before doing that, however, let me first say a few words about our role in investigation.

Representatives from the Center for Fire Research participated in the investigations in San Juan under the direction of the Bureau of Alcohol, Tobacco and Fire Arms. Teams from the Fire Administration and the National Fire Protection Association also participated in the investigations.

The mode of operation was exemplary. During the day, experts from each of these teams went out and did their own special tasks, looking for the kinds of things that their specialties and training gave them the basis for doing. In the evening, they would all come back and work together and share what they had learned during the day.

In a period of just a few days, a very clear picture began to emerge of the events that took place on New Year's Eve in that hotel. The direction and coordination of this investigation by the Bureau of Alcohol, Tobacco and Fire Arms and the cooperation among the professionals present was, in my judgment, excellent and noteworthy.

Also I'd like to take advantage of this opportunity if I may to introduce to you the two gentlemen from the Center for Fire Research who participated in this investigation. They are sitting behind me to my left, Dr. James Quintiere, the head of our Fire, Science and Engineering Division and Harold "Bud" Nelson, a senior engineer in the Center for Fire Research. Bud may recall was the president of SFPE a year or so back.

Now, if you will allow me, I would like to get up and take a brief run through of this fire as we understand it evolved from the technical studies that we conducted.

Let me begin by describing the hotel for you and then run through a sequence of events that took place in the ballroom, the foyer and the lobby and casino of the hotel.

In this figure (figure 1), provided by NFPA, we see an elevation and a plan view of the hotel. At the time of the fire, in the afternoon of New Year's Eve, the casino was crowded with people. In front of the casino—and the casino looks out on the big and beautiful waters of the Caribbean. The casino was full of people. The ballroom was essentially vacant. The fire started in the ballroom, the tragedy occurred primarily in the casino, and in the lobby area of the hotel.

Note that on this diagram, we are looking at a first floor section of the ballroom and the casino and main lobby are on the second floor level of the base of the hotel. The high rise residential tower stands on the structure that the casino and lobby rest upon.

At approximately 3:20 in the afternoon, a fire began in the South ballroom. Now, the sequence that I'm going to go through is based on calculations made by Dr. Quintiere and Mr. Nelson on the scene, and I'll share with you the sequence of events they believe they unfolded.

## IGNITION

Of course, I won't go into that part of it because that's a matter for investigation obviously, but will limit my remarks to what we established from the models and from generally available engineering data.

About one minute into the fire, if we were to look into the South ballroom say through the window or just outside the South ballroom here, we would see small flames rising from the cartons of furniture that were the principal initial fuel package in this fire event (figure 2). You see the flames beginning to rise and smoke beginning to accumulate in the—I have this in the wrong place. Let me put this over here so you can see it a little better—in the north ballroom.

By 3 minutes——

Mr. **Walgren.** Maybe I could ask you if you could show those to the audience first, because the way that angles, it is not visible to them and we want to all see this together.

Mr. **Snell.** OK. At 1 minute, you have a very small fire. Very little is happening, just a little flame and smoke inside the south ballroom. Again, looking into the south ballroom a few minutes later, we see the fire has spread significantly across the stacked furniture (figure 3). You have considerable flame and now a thick smoke layer beginning to develop in the South ballroom and in the North ballroom.

The fire at this point in time is about 1.5 megawatts. What does that mean? Well, if a light bulb has about 100 watts of energy, think about 15,000 of them all attached together in a small place; 1.5 megawatts is enough energy to completely involve a typical room in our houses with fire in moments.

At this point, we begun to have a significant fire and accumulation of heat and smoke from the south ballroom. At five minutes, conditions in the south ballroom are beginning, as we in the fire business say, beginning to take off (figure 4). Fire grows at an exponential rate. You can see already the rapid growth in the rate of burning and the amount of heat and smoke produced. As you notice from these diagrams, the smoke is getting much darker and thicker as the smoke accumulates.

Now, let's put ourselves in the position of somebody standing out in the foyer or perhaps even an observer looking through the windows on this side of the casino into the foyer. What would they see at this point in time? (Figure 5.) Well, up to 5 minutes, they would see very little, because all the action was taking place in the ballroom. At about 5 minutes, we notice the smoke layer is low enough so that at that time it would begin to come out of the ballroom door and begin to accumulate at the ceiling of the foyer. That's the condition that would have persisted for approximately the next 5 minutes.

This scene shows the situation as it would occur just before 10 minutes. Even at that time into the fire, the evidences of tragedy were very light, indeed. However, the conditions within the south ballroom are rapidly continuing to deteriorate, so just before 10 minutes, the accumulation of heat and smoke is enough to spontaneously ignite everything with fire, the phenomenon we call flash over (figure 6). At that point, everything in the south ballroom is being consumed with fire. The rate of energy released has gone from 1.5 megawatts to many, many times that, involving 200 megawatts. We have a tremendous fire raging within the south ballroom.

That accumulation of heat and smoke at about—very shortly after flashing over the south ballroom, takes its toll on the glass partitions separating the south ballroom from the foyer, so that just before 10 minutes, there is a sickening sound as the glass panels separating the foyer and the south ballroom shatter, releasing a veritable flood, a wall of fire, heat and smoke that begins to now accumulate in the upper level of the foyer, in a very short period of time (figure 7).

At that point, with this tremendous release of energy from the south ballroom, if I may draw your attention back to our diagram, this partition has disrupted, smoke and heat are filling the foyer, now we have a rush of smoke and hot gas coming across the lobby (figure 8). In fact, we estimate this smoke traversed the distance from the foyer to the lobby in approximately 40 seconds. From that point in time, this tremendous gas and heat generator is pumping those products of combustion into the lobby. Now, the layer begins to accumulate and the conditions in the lobby deteriorate, closing off means of escape for the many patrons of the casino and the main and back entrances to the casino.

Just a very few short moments later, again, another shatter of glass, the accumulating heat from the foyer brings the glass—ruptures the glass wall to the casino and again, this time a wall of flame and heat sweeps across the casino in maybe no more than 20 seconds felling the remaining occupants in their tracks (figure 9).

Ladies and gentlemen, we are looking at a scene that unfolded very rapidly. We don't know exactly when ignition began, but from the time of significant burning on this fuel package to the time at which the fate of the occupants of the casino was sealed, was a matter of a little more than 12 minutes.

Now, others on the agenda today will be speaking to the codes and other aspects of the impact of this fire.

I'd like to turn your attention now to various aspects of the capabilities that stand behind these charts as they relate to the central point that I made in terms of measurement tools.

What you see on these charts, the size of the flame, the amount and intensity of the smoke, the location of the smoke and the rate of movement of these various activities are all based—are all based on engineering equations with computer models of fire growth as a result of fire research that has taken place over the last decade or so.

The same capability that we have in them to characterize what took place, will allow us to address the many crucial "what if" questions that normally come to mind following such a disaster. For example, what if there were smoke detectors in the south ballroom, or if there had been sprinklers? What if the partition, the wall between the foyer and the south ballroom had not been made of glass but had been a fire rated construction, or the same was true for the wall of the casino? And, you can think of many others.

Well, let's take a look at these. For example, let's look at smoke detectors. You don't have to go very far into this sequence. If you had a smoke detector located in the ceiling of the South ballroom, it would have gone off well before this scene at one minute in most instances, and even if there weren't smoke detectors until well into the north ballroom, you still would have had a response very early on.

Now, if those detectors had been connected to a central system, and if people responded to them, and if the employees of the hotel were trained to respond, then the outcome of this fire may have been totally different and no lives would have been lost.

What if there had been sprinklers in the south ballroom or the north ballroom? Well, depending on the kind of sprinkler and the type of heads, the sprinkler head in this fire might have gone off anywhere from 1 to 3 minutes and there are other experts here that can perhaps give a sharper estimate of that. We have equations that give us a way to make those predictions.

So we might have had sprinklers going off at that stage in the fire development. In either case, what would the outcome have been? Low smoke, noise, commotion, inconvenience to the occupants of the casino, if indeed the staff had been well trained, they may have been forced to evacuate the building because of the fire, but little else might have been expected.

So, that's just to suggest some of the possibilities in using these tools to evaluate "what if" questions.

Let me address now a different matter, and that is the use of the measurement tools in investigations themselves. The calculations on which these slides are based were made on site by Mr. Nelson and Dr. Quintiere on small computers. This pocket computer, for example, and a lap computer that Bud has. Bud, why don't you just open that up and turn it on and get it ready to go here, and let us see what it takes to be in business. He's ready to roll and he has in front of him a menu of the various calculations that were necessary to make these predictions.

Gentlemen, I submit that these tools represent a breakthrough, the beginning of a new era, in how fire safety investigations can and should be conducted, so that we can get better and sharper answers to what took place, a better understanding of the answers to "what if's" and better information for the public about fire safety.

These tools also provide additional benefits. They provide the opportunities in addition to changes in investigations, changes in the way we design and evaluate buildings for fire safety, again using such tools, to assure compliance with fire safety codes and regulations by fire and building officials, and most importantly, for providing the public a means to learn about the hazards of fire and fire safe strategies.

For example, what we have seen here on these still charts, if presented emotionally and graphically provides the observer a sense, just a sense, of what happened. But, just think for a moment if we were looking at the screen of a computer console at these scenes in color, in real time, as the fire events evolved, and what if sitting at that console you had the opportunity to interact with the computer, to take measures or to try fire safety measures out. I submit that if that capability was put on the table, the fire safety education of our children would be greatly enhanced and the motivation of the population for fire safety could be greatly stimulated.

In summary, Mr. Chairman, I submit that the American public has no better idea of the hazards to fire they face every day, at home and elsewhere, in hotels and other kinds of public assemblies, than did the unsuspecting victims of this latest disaster.

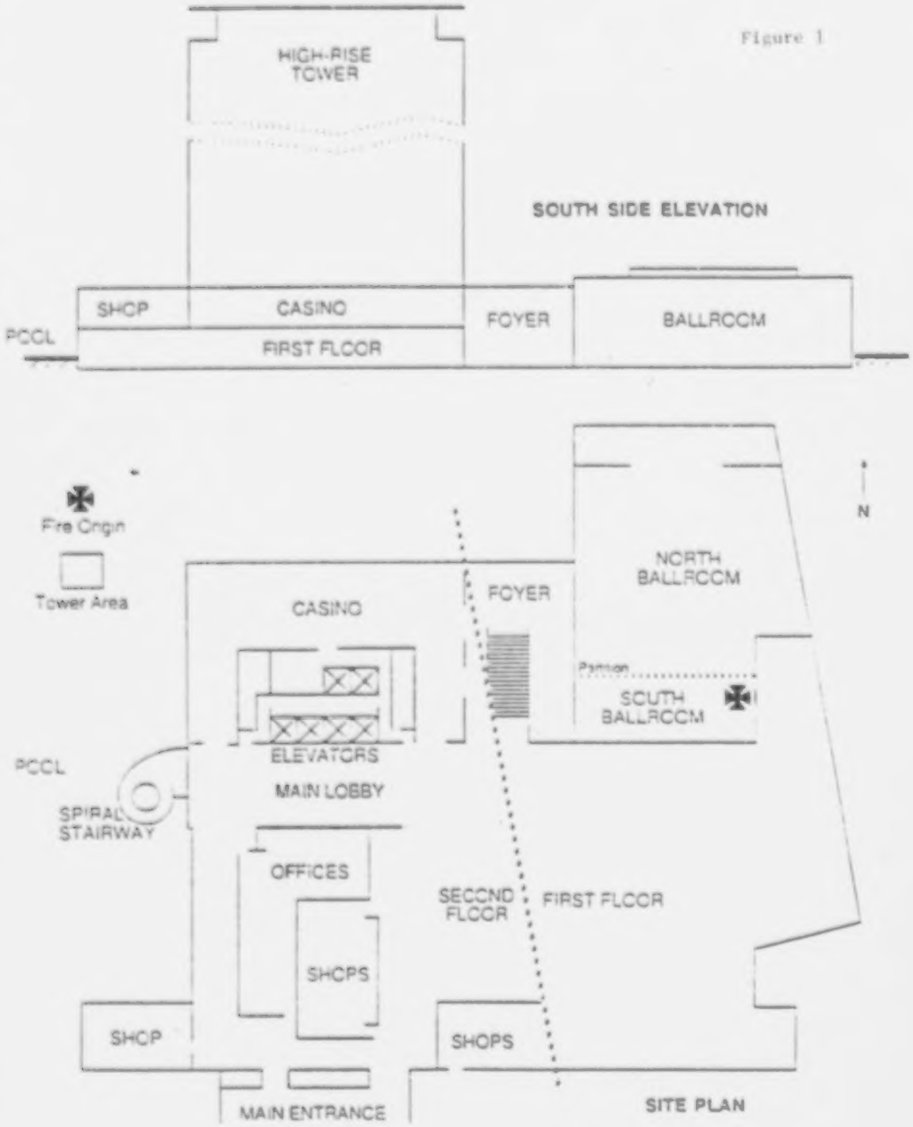
We are now developing the tools needed by the public, designers, manufacturers, industry, fire and code officials and others, to communicate, educate and motivate for fire safety.

The ultimate power of these tools lies in our ability to measure fire safety.

Thank you, sir.

[Figures 1-9 of Mr. Snell's oral presentation plus his prepared statement follow:]

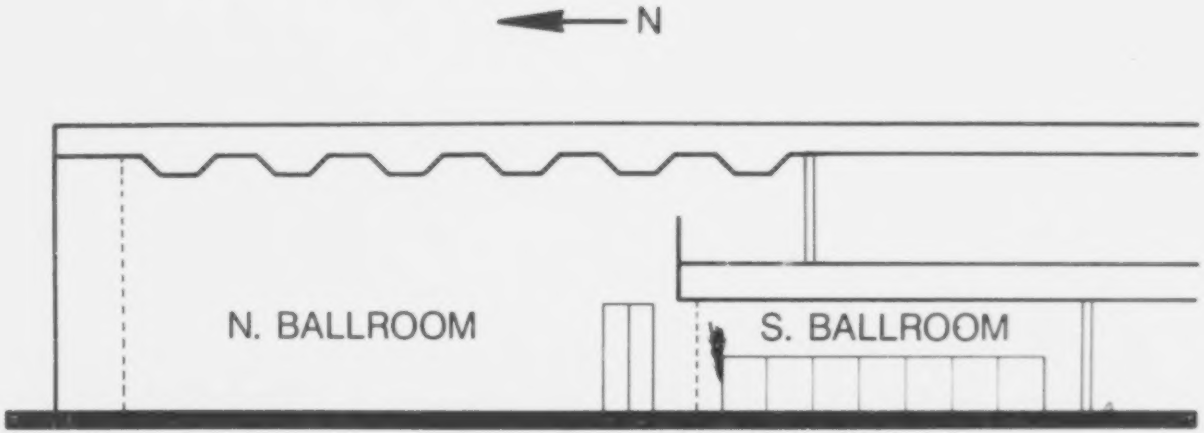
Figure 1


HIGH-RISE TOWER
SOUTH SIDE ELEVATION
SHOP
CASINO
FOYER
BALLROOM
POOL
FIRST FLOOR
Fire Origin
Tower Area
N
CASINO
FOYER
NORTH BALLROOM
Partition
SOUTH BALLROOM
ELEVATORS
POOL
MAIN LOBBY
SPIRAL STAIRWAY
OFFICES
SECOND FLOOR
FIRST FLOOR
SHOPS
SHOP
SHOPS
MAIN ENTRANCE
SITE PLAN

DUPONT PLAZA HOTEL
Not to Scale

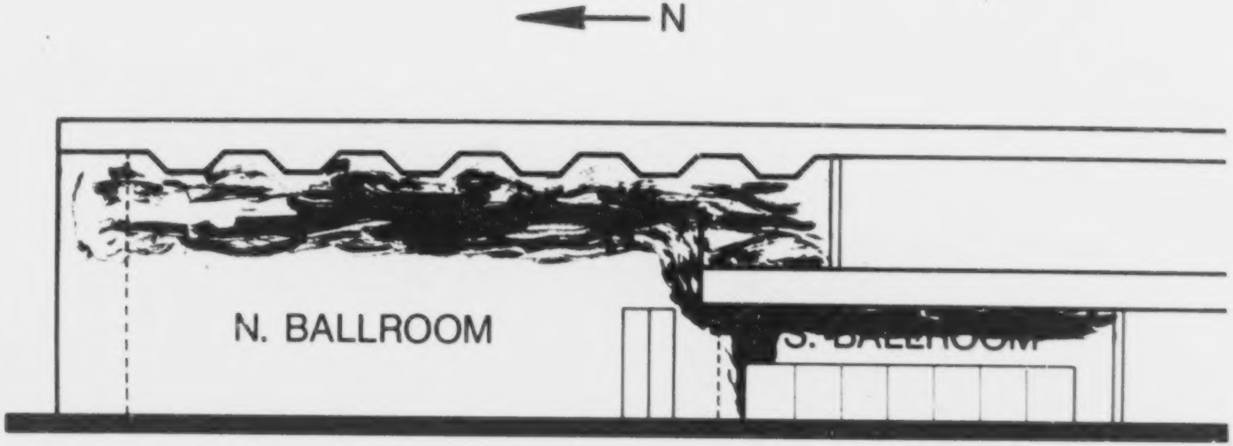
Source-NFPA

Figure 2


N
N. BALLROOM
S. BALLROOM

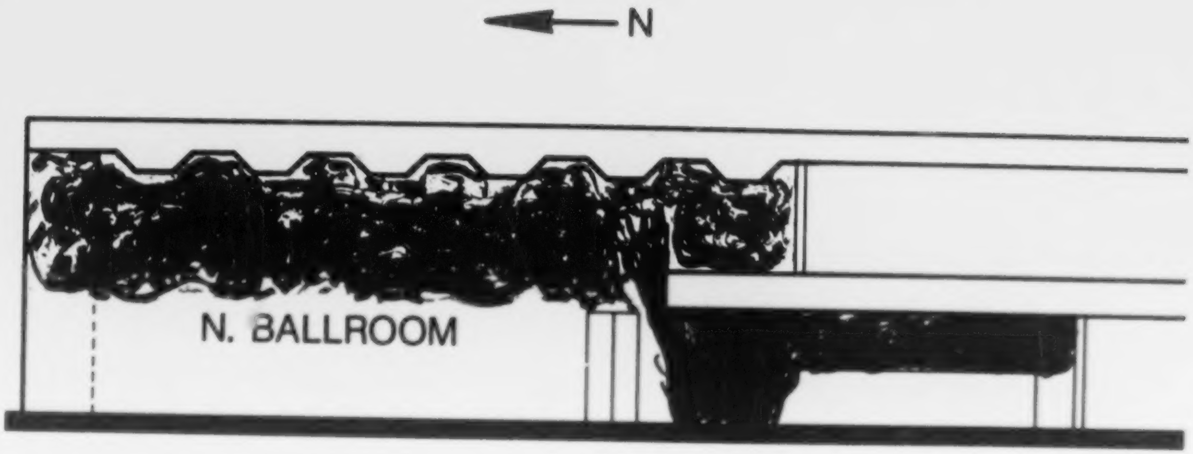
1 min.

Figure 3


N
N. BALLROOM
S. BALLROOM

**3 min.**

Figure 4


N
N. BALLROOM

**5 min.**

Figure 5

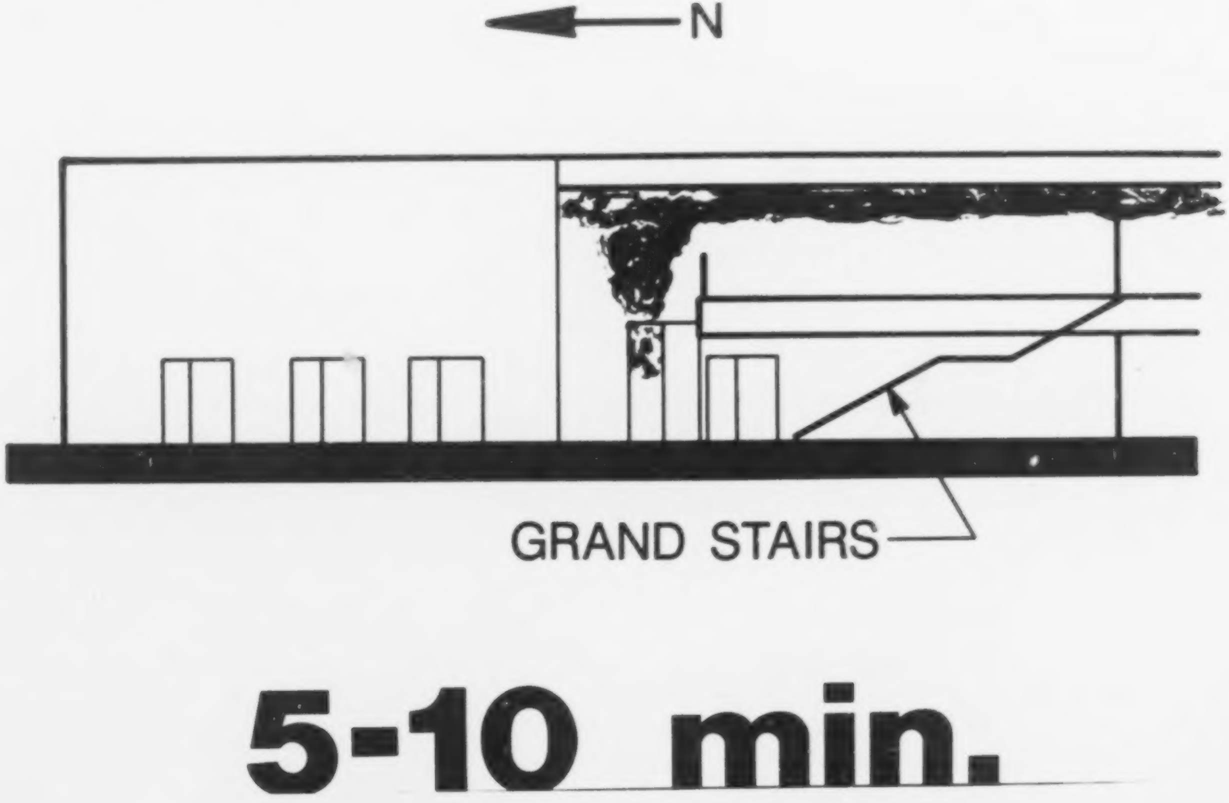
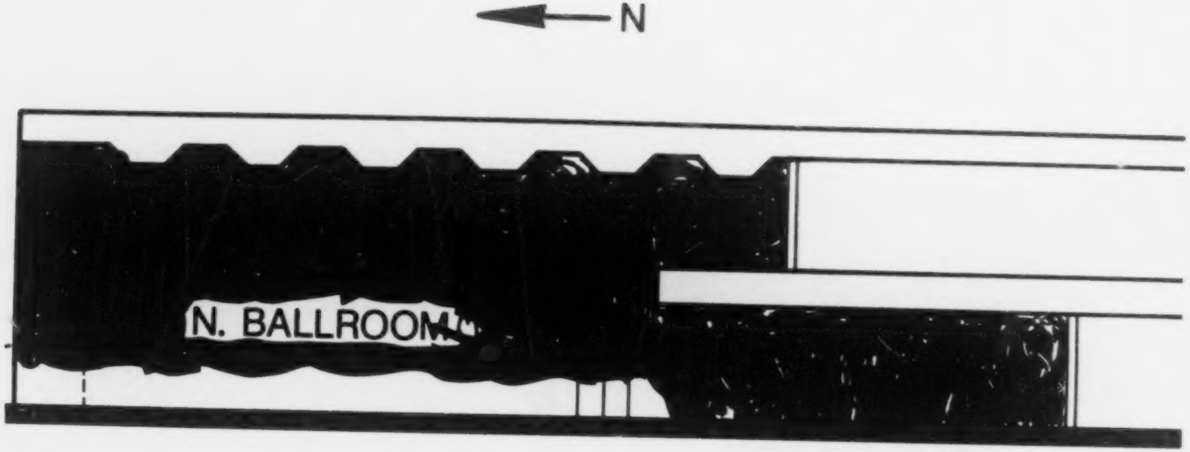

N
GRAND STAIRS
5-10 min.

Figure 6


N
N. BALLROOM

**10 min.**

Figure 7

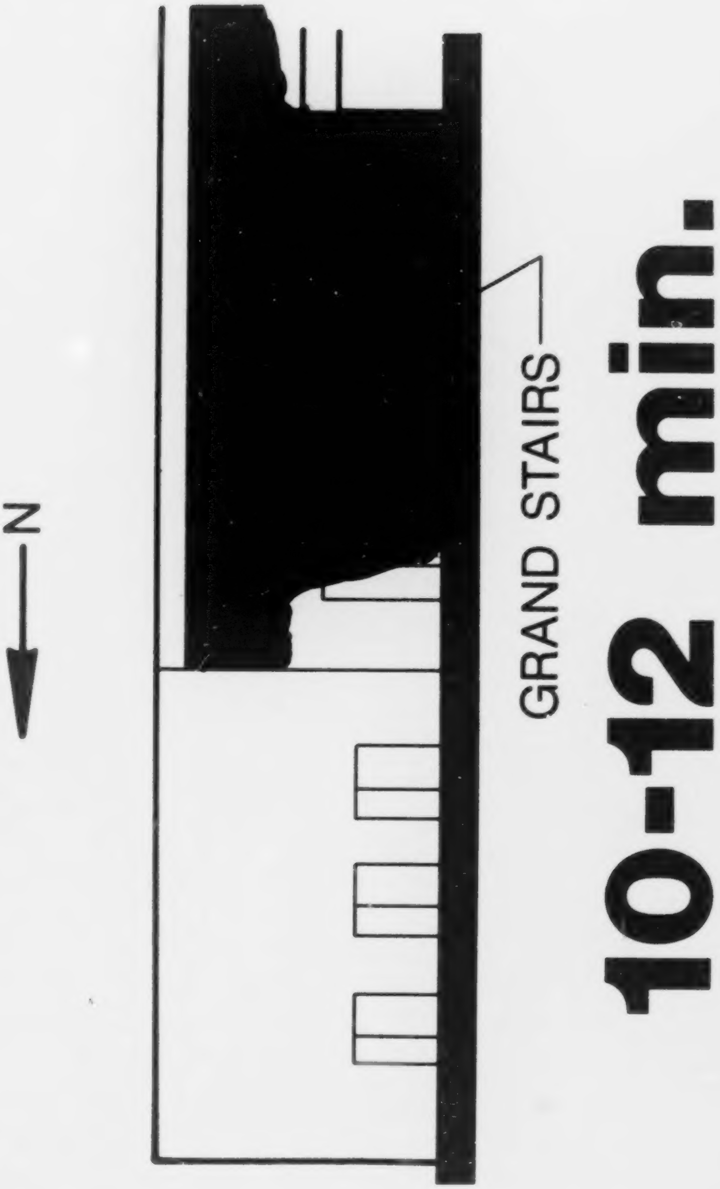

N
GRAND STAIRS
10-12 min.

Figure 8

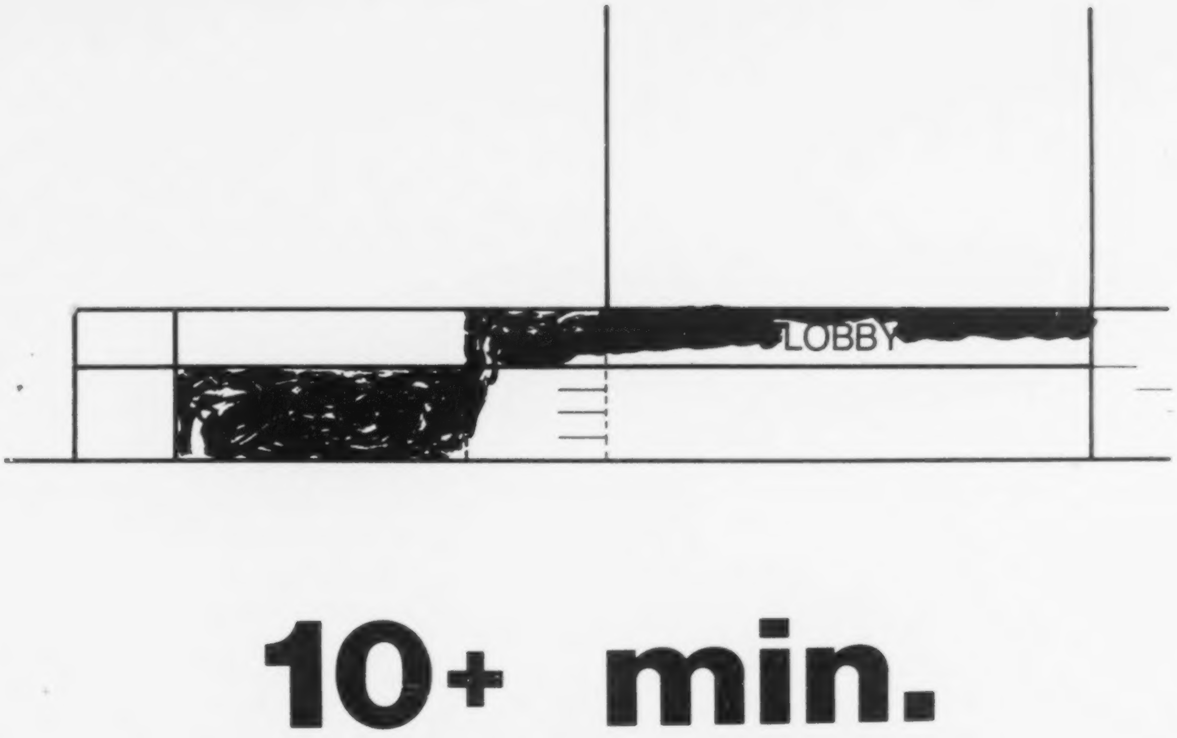
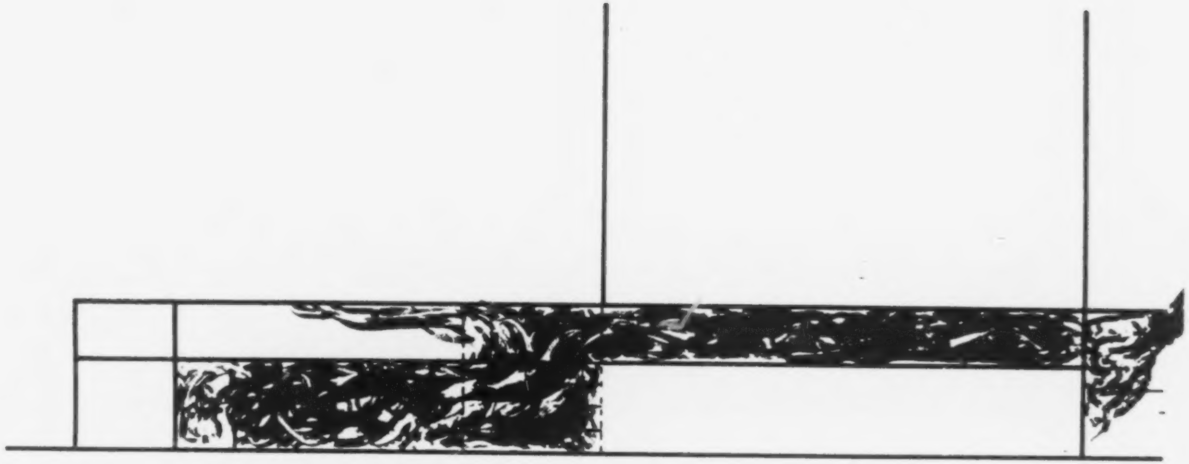

LOBBY
10+ min.

Figure 9



12+ min.

U.S. DEPARTMENT OF COMMERCE
GAITHERSBURG, MD 20899

STATEMENT OF

JACK E. SNELL, DIRECTOR
CENTER FOR FIRE RESEARCH
NATIONAL ENGINEERING LABORATORY
NATIONAL BUREAU OF STANDARDS

BEFORE THE

HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY
ON HOTEL FIRE SAFETY: WHAT'S NEEDED TO PROTECT OUR CITIZENS?

MARCH 5, 1987

Mr. Chairman, my name is Jack Snell. I am the Director of the Center for Fire Research (CFR) of the National Bureau of Standards. I appreciate the opportunity to appear before this Committee today to discuss the problem of life safety from fire, in particular hotel fires. One would hope that by now as a nation we would have our fire safety act together so that calamities like large loss hotel fires were a thing of the past, and the United States would no longer continue to post one of the worst fire death records in the world. Unfortunately, that is not the case. Even though we are still gripped by the horror of the Dupont Plaza Hotel fire, I submit that the American public has no better idea of the hazard to fire they face everyday in homes or elsewhere in hotels etc., than did the unsuspecting victims of this latest disaster. Why is this true? What can be done to change these grim realities?

These awful conditions continue for two reasons: first, people lack the tools they need to measure fire safety. For example, how can we tell how well a fire protection system will work if we don't have means to measure its performance? Tremendous strides have been made in measurement of fire risk, hazard and fire safety. These advances have launched a revolution in how fire is thought about, planned for, and confronted. The new measures now becoming available are making it possible to measure fire safety quantitatively, and to develop, "try out," or "practice" strategies for improving fire safety. Secondly, people lack the education and motivation needed. One is not likely to avoid a danger he is not aware of or does not comprehend. These new measures can help open the public's mind to greater awareness of the hazards of fire and increase their motivation and ability to reduce fire risks and losses.

I would like to address hotels and fire in general, our role in the Dupont Plaza hotel fire investigation, the application of our tools to that fire, and conclude with a few recommendations.

## HOTELS AND FIRE

There is something uniquely terrifying about a hotel fire, and there have been far too many of them. This may be because of the strangeness of the surroundings to the hotel guest, the isolation and lack of timely information about what is happening or what to do in a fire emergency, or some combination of these and other factors. Surely, the perceptions and attitudes as well as the "fire safety" knowledge of hotel occupants are as important to their ultimate safety as factors relating to the design or fire protection features of hotels. For example, the investigation report of one such fire reads as follows:

> "The loss of 119 lives and the injury of 90 persons... is essentially the effect of over-confidence in a type of structure for a great many years described as 'fireproof' by many engineers and believed to be so by the public."

> "The screams of the ... occupants and the dull thud of bodies hurtling to (the street) should eliminate for all time the illusion that this and other buildings... are secure against all perils to life safety without adequate safeguards ..."

These statements appeared in the NFPA report of the Winecoff Hotel disaster of December 7, 1946, thirty years ago. Too many people still think they are safe in buildings that are made of non-combustible construction materials. Similarly, frequently, fire investigation reports cite victim's apparent lack of knowledge of available escape routes as significant factors in loss of life. We need to do a better job of communicating fire safety information.

In the excerpt of the Winecoff hotel fire report cited above, the "safeguards" referred to were for combustible interior finish and contents, i.e., furniture and furnishings. The fire hazards of highly combustible interior finishes have been greatly reduced, however the fire hazards of hotel contents may in fact even be greater now because of the relatively high energy release rates of many modern materials used in them. Major hotel fires in just this decade include the MGM Grand in Las Vegas which was followed closely by the Las Vegas Hilton fire, the Westchase Hilton fire in Dallas, the Stouffers Inn in New York, and now the Dupont Plaza fire in San Juan, Puerto Rico. Highly combustible contents were clearly important factors in the magnitude of loss for each of these fires. Reduction of the hazards of combustible contents remains a major piece of unfinished business in improving hotel and home fire safety.

Now, as in the past, the typical pattern of response to a major loss fire is the same--a flurry of intensive media coverage, public outrage, and investigations and hearings leading to the identification of a "cause," perpetrator, or fault and resulting in new codes or standards provisions that ostensibly assure the public "that fire won't ever happen again." And, even though that identical fire probably won't recur, others do. Why? Simply because we lack tools that can be used to measure or evaluate the "safety" of a particular design, material, building, fire protection system, personal escape plan or even attitude or perception. For example, a concrete hotel may well not burn down, nonetheless it can still be a "deathtrap." This has been "proved" by the MGM Grand and Dupont Plaza hotel fires to name just two. (The MGM Grand is now considered by many as one of the "safest" hotels in the country as a result of the extensive retrofit of it following the fire in November 1980.) Similarly, a hotel can have sprinklers, but if they are not in the right place, it can be a "deathtrap." For example, this was the case with the MGM Grand, and Stouffers Inn fires. It is not always easy or obvious to tell whether a building is "fire safe." Fire safety depends on many factors, including, of course, the vast number of fire scenarios that are possible.

What is needed is a means to evaluate a hotel for all the many types of fire it may be subjected to, and to evaluate the likely behaviors, and fate of, the occupants. More precise means are needed for determining the sequences of events that occurred in a fire incident. We need to determine what "would have" happened with various alternatives, e.g., better materials or compartmentation, early warning, suppression systems, etc. What I am suggesting is that we need methods to simulate the performance of a building under assumed conditions of fire, methods like those routinely used, for example by airline pilots to "practice" in-flight emergencies safely on ground-based computerized simulators. Before going into detail on this however, first let me say a few additional words about the importance of hotels in the context of the overall fire problem.

Hotels and motels represent just the tip of the iceberg of the U.S. fire problem, accounting for only 1.3% of the total fire deaths according to the National Fire Protection Association. However, it is crucial not to become complacent in view of such statistics. Hotels are important because of the public's perception and expectation that they should be safe and secure in them. Hotels are important because they present a large number of potential sources of fire--laundry, kitchens and storage rooms, restaurants, night clubs, convention centers, shops or commercial spaces, etc. in addition to the occupant rooms. Hotels are important because they often present large concentrations of people to any fire incident that may occur in them. They are also important because too often they are the target of negligence, carelessness, arson, and, increasingly, exposure to terrorist attack. Finally, hotels are important because new fire safety practices and technologies introduced in hotels ultimately find their way into homes. Lessons learned about hotel fire safety can have profound impacts on the rest of the fire problem.

## THE DUPONT PLAZA HOTEL FIRE: AN ENGINEERING ANALYSIS

CFR staff have been involved in two aspects of the aftermath of the Dupont Plaza hotel fire. Two of our staff--Dr. James Quintiere head of the CFR Fire Science and Engineering Division and Mr. Harold Nelson who is a recent past-president of the Society of Fire Protection Engineers--joined the on-site investigation on the fourth day following the fire. These men, along with investigators from the United States Fire Administration (USFA) and a team from the National Fire Protection Association (NFPA) participated in the investigation directed by the Bureau of Alcohol, Tobacco and Firearms (BATF). The coordination of this effort by the BATF and the cooperation among these professionals was exemplary. During the day, each specialist went about his own work. At night, the group assembled and pieced together what each had learned during the day into what soon became a fairly clear picture of what happened. In particular, Nelson and Quintiere had at their disposal--on pocket and portable, lap size, microcomputers--recently developed fire models and engineering equations which they used to calculate the various stages of the fire's development. This was a precedent-setting application of these models on the scene of an active fire investigation.

I served on the Commission on Fire Safety at the request of the Governor of the Commonwealth of Puerto Rico. The Commission was co-chaired by Clyde Bragdon, Administrator of the U.S. Fire Administration and Rual Gandara the distinguished first chief of the Fire Service of Puerto Rico. (Members of the Commission are listed on Attachment 1.) The Commission report will be released soon. I will focus my remarks on the application of scientific and engineering research to improving hotel fire safety.

As you pointed out in your letter of invitation Mr. Chairman, the criminal investigation of this fire is still in progress and prevents me from discussing the details of ignition or other factors that might impact on the criminal investigation. My remarks will address our estimates of the development of hazards based on generally available engineering data.

In the late afternoon of the last day of 1986, a fire of devastating intensity swept through the lower floors of the Dupont Plaza Hotel in Puerto Rico, killing 96 people. In some respects, this fire seemed remarkably similar to the MGM Grand Hotel fire of December 21, 1980, in which 86 persons died. However, nearly all of the deaths in the Dupont Plaza fire were on the second floor and caused by heat and flames in marked contrast to the MGM Grand fire in which fatalities resulted from smoke inhalation involving persons mostly remote from the fire in their rooms or corridors many levels above the fire. In the Dupont Plaza fire, about 200 persons trapped on the floors above the fire apparently were able to tolerate the smoke while awaiting escape or rescue as the fire many floors below burned for several hours.

The NBS contribution to the BATF-USFA-CFR investigation report of this fire is based on a somewhat more detailed analysis we have refined over the last several weeks and which will be published by NBS as a separate back up report. I would like to summarize it briefly for you. (The complete NBS report will be submitted for the record when it is available, if you so desire.) I must emphasize that this analysis is based on how we believe the fire behaved in this particular building configuration. It is not based on the burning properties of the specific materials or products that were involved; only generic properties were used.

Figure 1 is a simplified elevation of the hotel viewed from the North. The fire was assumed to originate on a large pile of cartons of new furniture depicted in this figure by an "x" in the south ballroom. The south ballroom is under the balcony and behind a set of removable partitions which separated it from the much larger north ballroom. Smoke began to fill both the 10-foot high south ballroom and flowed into the main 21-foot high north ballroom as the fire continued to progress in the cartons. This is illustrated by arrow 1.

Ballroom doors leading to the foyer, which contained the main staircase to the lobby, and outside were opened during this period.

As the smoke filled the ballrooms, it is estimated to have emerged into the foyer at approximately 5 minutes. This, we believe, was the first general indication of fire to the occupants of the lobby.

About 5 minutes later, we estimate flashover occurred in the south ballroom, involving large portions of the combustible floor and wall coverings. The window partitions to the foyer broke and a large quantity of smoke and flames were released into the foyer (arrow 2).

In roughly 40 seconds, a deep hot smoke front traversed the lobby area forcing the occupants to flee (arrow 3).

During these last few minutes, people in the casino became aware of the fire, but now those remaining had their only exits blocked by the dense, black smoke in the lobby.

Two minutes later, the exposed wood deck roof of the foyer became involved in fire and the extended flames broke the glass partitions to the casino (arrow 4). This sent a deep front of fuel rich smoke and flames across the casino. This front probably ignited most of the combustibles in the casino in the next minute. Occupants were hopelessly trapped. This is now approximately 12 minutes from the initial development of the fire. That is all the time we estimate it took for this tragedy to occur.

The conditions leading to the rapid spread and growth of this fire had little if anything to do with the allegation the fire was intentionally set. The outcome resulted from the design, materials, fire protection devices and systems of the hotel, and from the training, attitudes and perceptions of the people involved.

We have applied the same equations and models used to predict the course of this fire, to estimate the possible impact alternative fire protection devices, or systems may have had, specifically, smoke detectors for early warning, fire sprinkler protection in the ballrooms, foyer, and casino; and fire resistant materials for the partitions, and the wall and floor coverings in these spaces.

The response of a sprinkler head depends on the particular style of head and its position relative to the fire. Our analysis looked at the whole range. A modern, quick response head located directly above the fire would have been expected to go off in about 45 seconds after the cartons started to burn. At this time, the flame would have only been about three feet tall and there would have been very little rise in the smoke temperature. If, on the other hand, a traditional sprinkler head had been in a position about ten feet away, probably the slowest response we should expect, the head would have gone off at about three minutes. While this is a comparatively long time, it would have occurred at just about the time when the flames from the fire started to lick the ten feet high ceiling and the smoke layer had filled to about two feet down from the ceiling and its temperature had risen to about 265°F. This would certainly be an uncomfortable place to be but not yet fatal. The hotel had a good water supply and an operating sprinkler head would have probably extinguished, or at least controlled this fire.

Smoke detectors would have operated more quickly. If one had been located directly above the fire, it would have gone off in about fifteen seconds after the flame got established on the cartons. At this time that flame would probably have only been five or six inches tall. If a smoke detector had been located near the far end of the room, say as much as forty feet from the point of fire initiation, it would have been another forty-five or fifty seconds until the detector operated. Of course, detectors only send alarms. Their worth depends entirely on how people respond to them.

Many modern building codes would require that the wall between the south ballroom and the foyer have at least a one-hour fire resistance. Had this been present, the fire would not have broken out into the foyer. There would, of course, have been serious damage inside the ballroom complex and flow of hot smoke and gas into the kitchen service corridor, but probably little threat to persons in the lobby or casino.

Had the partition between the north and south ballrooms been of a substantial construction, i.e., a fire-rated partition, the time to flashover would have been greatly stretched out; in fact, with no doors open flashover most likely would not have occurred.

The number of "what if" predictions that could be made is almost as endless as the questions that can be asked. Figure 2 summarizes our engineering estimates. This provides a framework for addressing such "what-if" questions. In some instances, we can now make reasonable engineering predictions, others would require extensive testing and experimentation. One example of the latter would be the contribution of the fabric wall covering material used in both ballrooms. A series of tests on this material and full scale tests of the stacked cartons of furniture burned would be needed to resolve this issue.

These analyses make use of tools for measuring the ignitability, flammability, toxicity, etc., of materials or contents; for quantification of the hazards to life of fire; and for prediction of the outcome of a fire. We have demonstrated how they can play a crucial role in addressing key issues concerning hotel and residential fire safety. Further, think about the impact computer models have had in aviation. It is common today to literally design and fly an airplane on a computer. In fact many of us, even non-pilots, have used personal computers to take the "controls" of airplanes from "Piper Cub" to a supersonic jet fighter on realistic flight simulators using software available for less than $40. Such realistic simulations are possible because there is sufficient knowledge of aeronautical engineering to predict aircraft performance and thus produce such realistic software. Professional pilots routinely use somewhat more sophisticated simulators to experience "safely" many in-flight hazards so they can learn how to survive them should they occur in reality. Until recently there simply wasn't sufficient knowledge about fire to do the same sort of thing in this field.

Last August, we introduced a hazard assessment method to industry under the name, HAZARD I. This method calculates the hazard to people from a specified fire in a specified building. A report describing the method is now in final review and the software, which comes on a set of six 5-1/4 inch floppy discs is going through the final stages of an elaborate debugging process. We expect this system to be available this spring. The HAZARD I system is being released at this time as a prototype system for pilot study use and for industry review and comment. Meanwhile we are proceeding with a number of important enhancements. A progress report on HAZARD I is appended as Attachment 2.

## SUMMARY AND RECOMMENDATIONS

There is no question about it, technologies exist to make hotels and homes fire safe. The problem is fire safety involves trade-offs, trade-offs between cost, function or comfort, and safety. Disasters result when either the risks of fire were not perceived correctly and/or these trade-offs weren't assessed properly. Obviously, it is difficult to do these things, and particularly so in the absence of adequate measurement tools.

This tragedy, like many before it, demonstrates the fact that most people have inadequate knowledge of fire risks and hazards, thus aren't motivated to act appropriately.

People lack means to make the trade-offs of safety-cost-function required to reduce their risks to acceptable levels.

Also, it confirms that available technologies either are too costly or are perceived as such by many hotel operators. (For example, the Dupont Plaza is not the only unsprinklered hotel. It has been estimated that as many as 95% of hotels and motels are not protected by sprinklers.)

The type of tools NBS is producing can provide bases for powerful new means to address these needs. For example, these tools can provide the basis for simulators and related materials to permit people to evaluate how well various combinations of fire protection technologies will work, to enable quantitative evaluation of fire safety trade-offs, and to stimulate and guide development of more effective and affordable technologies for fire protection. NBS is working with others in the fire protection community to take these steps.

The public, state and local governments and industry can benefit from further analysis this year of the Dupont Plaza hotel fire. By providing answers to many "what-if" questions, and estimates of the impacts of changes in codes and practices proposed as a result of it much can be learned.

NBS scientists successfully applied their equations and models in the Dupont Plaza fire. This not only affirms that the CFR research program is on the right track, but also suggests this approach may become a powerful new aspect of future fire investigations. Specifically, the use of a multi-discipline on-site investigation team, including fire scientists and engineers; use of computer-based models and engineering tools for predicting fire and its consequences; and complementary small and full scale tests to verify computer-based fire "re-creations."

## BIOGRAPHICAL SKETCH

Jack E. Snell, Director
Center for Fire Research
National Bureau of Standards

Dr. Snell joined the National Bureau of Standards in 1971 following military service in the U.S. Air Force, a position in airline maintenance engineering, and research and teaching posts at Princeton University. At NBS, Dr. Snell headed research efforts relating to building service systems and the NBS programs in energy and energy conservation before becoming Director of the Center for Fire Research in 1981. Dr. Snell is Co-Chairman of the U.S. National Fire Research Strategy Conference, Chairman of the National Fire Protection Association Advisory Committee on the Toxicity of the Products of Combustion, and is a member of the ASTM Committee E 5 on Fire Test Standards. Dr. Snell has a BSE from Princeton University and MSE and PhD from Northwestern University.

Figu 1

## DUPONT PLAZA
## FIRE GROWTH

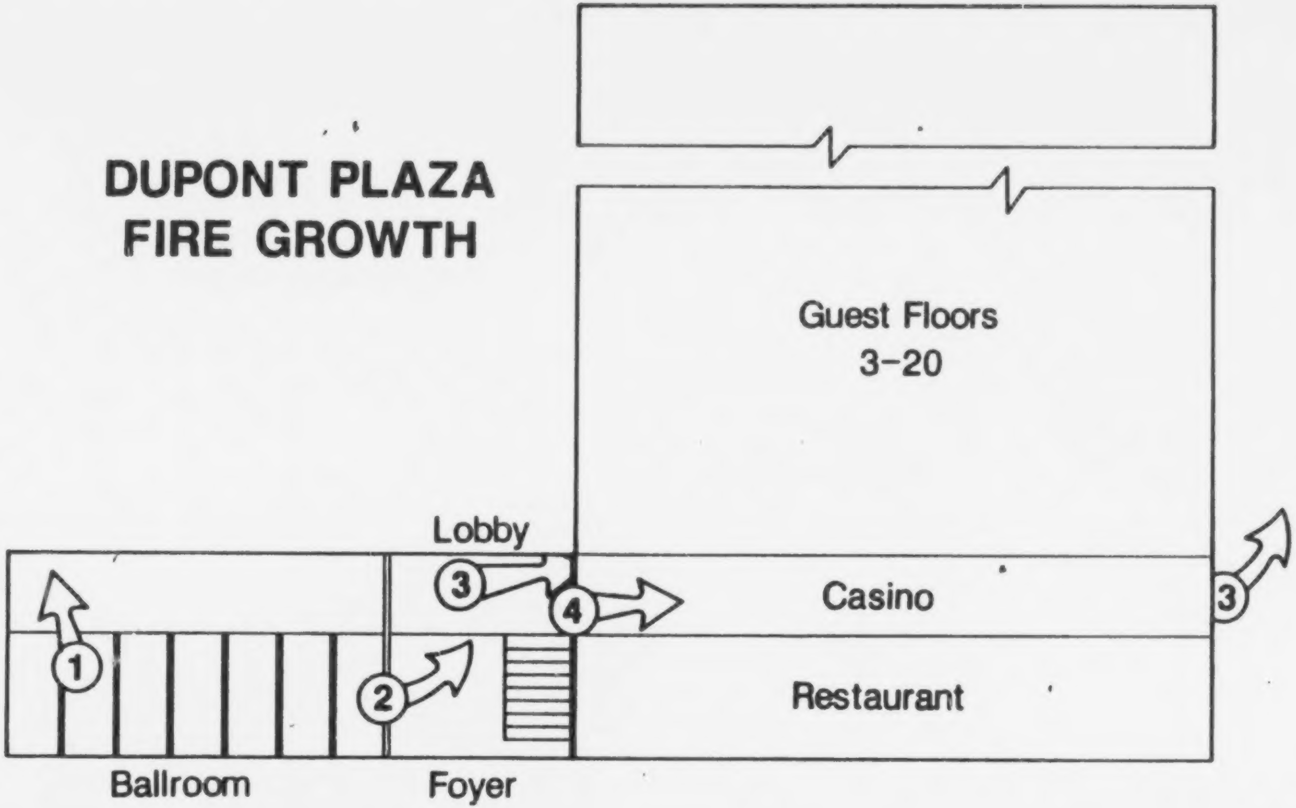
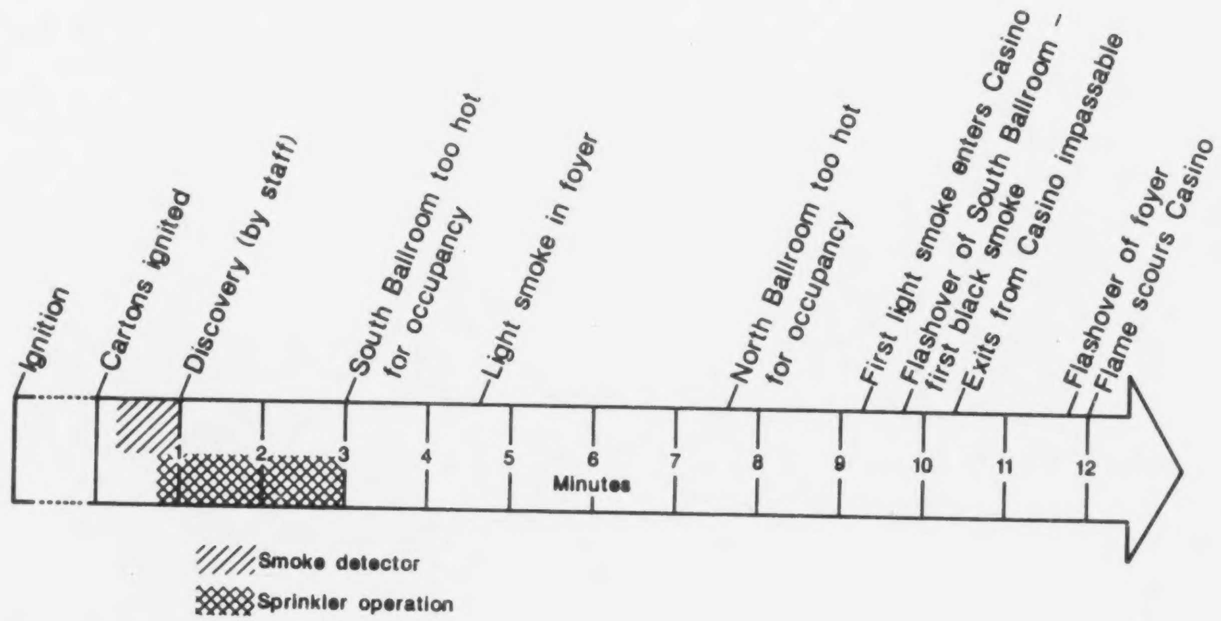

Guest Floors
3–20
Lobby
Casino
Restaurant
Ballroom
Foyer
①
②
③
④
③

Figure 2

Estimated Times of Events



Attachment 1

## The Commission on Fire Safety

Clyde Bragdon
Administrator
U.S. Fire Administration
Washington, DC

Jack E. Snell
Director
Center for Fire Research
National Bureau of Standards
Gaithersburg, MD

Jack Sanders
National Fire Protection
Association-Western
Representative
San Diego, CA

Joseph M. DeMeo
Chief of Fire Prevention
Fire Department - City of New York
New York, NY

Anthony Romero
Deputy Chief Fire Marshal
Fire Department - City of New York
New York, NY

Raul Gandara
Ex-Fire Chief
Fire Service of Puerto Rico
San Juan, Puerto Rico

Pedro Oscar Schuck
Ex-Fire Chief
Fire Service of Puerto Rico
San Juan, Puerto Rico

Benjamin Acosta
Expert
Risk Insurance Adjuster
San Juan, Puerto Rico

Filiberto Garcia
Former Member of the
Planning Board of Puerto
Rico
San Juan, Puerto Rico

Carlos M. Rivera
Asst. Chief of Department
Fire Department - City of
New York
New York, NY

Attachment 2

# NBS Method for Fire Hazard Assessment
## HAZARD I
## Status Report

Reliable methods for smoke and fire hazard analysis are the ultimate objectives for fire research. Such methods will provide means to quantify the difficult trade-offs required in fire safety decision-making, trade-offs involving life safety, function and cost. Methods of this sort will revolutionize fire safety practices and should lead to marked reductions in fire losses and costs to the nation. The National Bureau of Standards is now addressing the complex combinations of physical and chemical phenomena that influence the outcome of a fire, namely the extent of fire growth, of smoke spread, and their impacts on the life safety of a building's occupants. Traditional methods for estimating fire hazard, largely expert judgment, cannot do this quantitatively or objectively.

The first version of a quantitative fire and smoke hazard analysis method, HAZARD I, has been developed and is under review within NBS. Its development has included significant participation by fire and building officials. HAZARD I will soon be released for a period of trial evaluation and use within the fire community. This shake-down process is important to assuring the method is practical and "user-friendly" and produces results that are consistent with best expert judgment and fire experience.

HAZARD I is a prototype of a computer-based hazard evaluation system. It's components are based on currently available models and research findings. Gaps in our knowledge are bridged with state-of-the-art guidelines or "rules of thumb" to make the system comprehensive and complete. HAZARD I is unique in that it combines all the pieces relevant to evaluating life safety in fire in a single family residence, including fire, smoke, design and human decision-making variables. Subsequent extensions of the HAZARD I method will address additional occupancies and broader ranges of fire, design and occupant conditions.

The method is designed to predict the outcome in terms of occupant incapacitation or death for a given set of circumstances (scenario) in a prescribed building. It identifies the primary cause of the outcome (toxic gases, intolerable temperatures, or vision obscuration) so that mitigation strategies can be formed and tested. Thus, it is a tool to evaluate the consequences of a design, and the impact of fire protection features on the outcome of fires.

The use of quantitative fire and smoke hazard analysis techniques such as HAZARD I should provide significant cost savings. Potential solutions to fire problems can be studied on the computer holding other conditions constant to give benefit-cost relations for each alternative. This provides the design flexibility that reduces redundancies and cost without sacrificing safety. In addition, new technology can be evaluated more quickly.

For example, the toxicity of combustion products is recognized as a very complex problem to address. Quantitative methods of hazard analysis should allow us to determine the impact of toxicity relative to the impact of other fire hazards.

In August 1986, details of the prototype method, HAZARD I, were described to more than 150 representatives of industry, other federal agencies, and state and local government at the National Institute of Building Sciences' (NIBS) Fire Hazards Conference 1. Also, participants in this Conference were briefed on a demonstration of the method and toured laboratories of CFR where validation tests of the method are being conducted. The proceedings of the Conference are being prepared for publication by NIBS.

The HAZARD method is being incorporated into a major public-private sector program to develop a quantitative method to predict fire risk. Fire risk goes beyond hazard to include also the likelihood of occurrence of fire. This program, directed by the National Fire Protection Research Foundation (NFPRF--a companion to the National Fire Protection Association) includes an advisory board with membership spanning the entire fire protection community.

The following is a more detailed discussion of HAZARD I:

### Overall Approach

Expert judgment is the traditional way of assessing potential fire hazards associated with specific products. In the past, this judgment has been based largely on experience. In recent years, this has been complemented by available fire statistics, information on specific fires, and both full and small scale fire tests. The next logical addition to this "bag of tools" is a quantitative method of hazard analysis that removes much of the dependence on expert judgment.

The approach used in HAZARD I involves, for a specified building and set of fire scenarios of concern, calculation of the development of hazardous conditions over time, calculation of the amount of time building occupants need to escape under those conditions, and an estimate of the resulting loss of life based on assumed occupant behavior and tenability criteria.

The buildings and scenarios of interest to the user will depend on the purpose of the assessment. For example, product manufacturers will generally not be concerned with a particular building but will be concerned with scenarios involving their product in whatever building types it may be used. The interest of fire investigators will be in specific fires in specific buildings since they are reconstructing a specific incident after it has occurred. The flexibility to accommodate various interests is built into HAZARD I.

To assist the user in using the method and to demonstrate the capabilities of the procedure, a set of reference examples has been compiled. To simplify the building and fire scenario selection, a set of prototypical residential buildings and common fire scenarios has been developed. The user can substitute his product for that in one of the examples, use one of the prototypical buildings or scenarios, or perform an analysis on a different building or scenario, provided that the phenomena involved are not beyond the current technical capabilities of the models.

A block diagram of the overall method which shows the relationship of the example cases to it is shown in the enclosed figure 1. As shown in this figure, problems that are outside the scope of the method revert to the traditional approach of judgment. The "run programs" block in figure 1 is described in more detail in figure 2.

## Contents

The current form of HAZARD I that is now undergoing review within NBS consists of a three volume report and a set of six diskettes containing the software necessary to conduct hazard analyses of products used in residential occupancies. All of the software will operate on any IBM PC or compatible MS-DOS computer with the following minimum configuration:

-512k MEMORY

-GRAPHICS CARD (IBM CGA OR EGA, OR HERCULES COMPATIBLE)

-HARD DISK DRIVE

-MATH CO-PROCESSOR (8087 OR 80287)

-PRINTER

-DBASE III+ (REQUIRED ONLY FOR THE DATA BASE PROGRAM)

## Scenarios

HAZARD I is designed to handle many different fire scenarios encountered in residential fires. The method contains a procedure for selecting the factors which are needed to define the scenario. The example calculations included in the report address the following types of fires; an upholstered furniture fire caused by ignition from a cigarette, a kitchen fire caused by a fat fire in a pan, and a Christmas tree fire. The residences used in these example scenarios include a two-story single family home, a townhouse, and a ranch style house.

## Validation

The results from the Fire and Smoke Transport (FAST) model built into HAZARD I have been compared with the results from over sixty full scale smoke filling experiments in the CFR large scale fire test facility. In addition, a major effort, as part of the review process, is currently underway to compare FAST results with experimental data in the scientific fire literature. FAST appears to give very good predictions on the spread of smoke and gases during the early stages of the fire, up to room flashover. The FAST model should be used with caution to predict conditions after room flashover. This is not a significant limitation when predicting hazard to people in single family residences.

### Limitations

The scope of HAZARD I is limited to the evaluation of the fire hazard associated with products in single-family residences. This is because the initial data base contains only data on materials typical of residences and because HAZARD I cannot model such important, large-building phenomena as the effects of heating and ventilating systems on the spread of smoke and the detailed flows in tall shafts and stairwells.

Beyond the limitation of scope, each of the program modules have simplifying assumptions to make them easier to use and to work on small computers. Whenever possible these assumptions are conservative; however each user must understand the limitations of the method and use it only for those applications that are appropriate. At this stage practical application of HAZARD I should be limited to those with experience and skills in fire protection. The CFR needs and anticipates significant constructive feedback from the fire protection community on the problems, uses, and needed improvements in HAZARD I.

### National Fire Research Strategy Conference Task Group

The National Fire Research Strategy Conference (NFRSC) has formed an industry/government task group to organize an industry-supported fire hazard data base to provide the data needed for input to the fire and smoke hazard analysis methods. The chairman of the task group was appointed by the steering committee for the NFRSC. The members of the task group were selected by the chairman to include those known to have an interest in or some activity involving fire properties data bases. Membership in the NFRSC task groups is open to those willing and able to participate in them.

### Availability

HAZARD I will be released as soon as all the within-NBS technical reviews are completed. These reviews are expected to be completed by early spring. The method will be released as a prototype method for a period of about one year for trial use, review and evaluation, in addition to its scrutiny by the two groups mentioned above. Subsequent releases of the HAZARD I method will incorporate feedback from this process as well as technical enhancements developed during the same periods.

We welcome any comments from the members of the Committee and staff regarding the hazard analysis method and its use.

Figure 1

# THE OVERALL METHOD

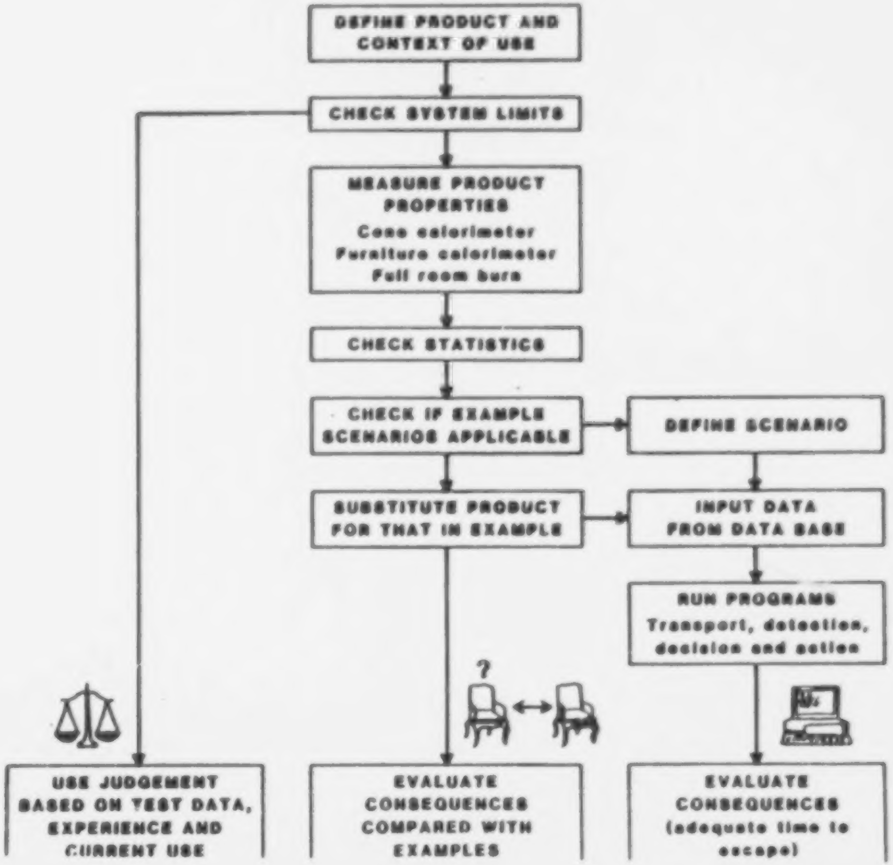
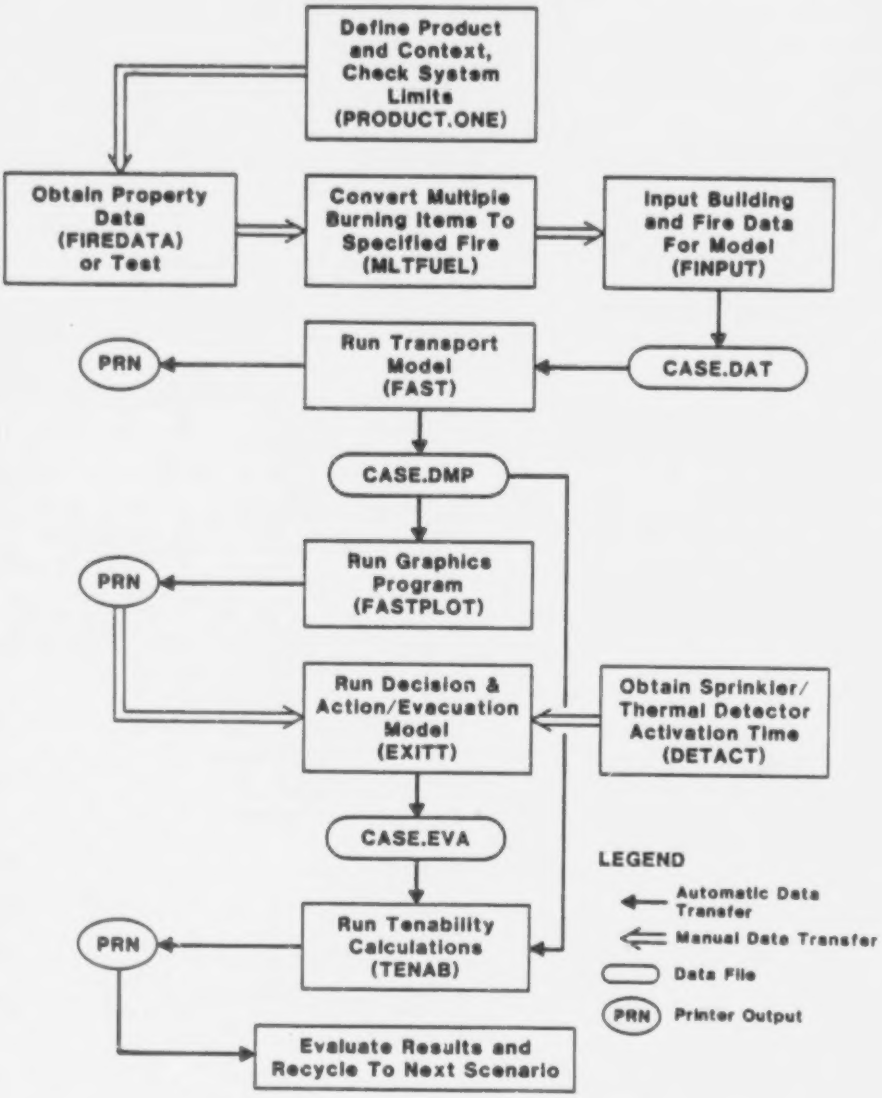

DEFINE PRODUCT AND CONTEXT OF USE
CHECK SYSTEM LIMITS
MEASURE PRODUCT PROPERTIES
Cone calorimeter
Furniture calorimeter
Full room burn
CHECK STATISTICS
CHECK IF EXAMPLE SCENARIOS APPLICABLE
DEFINE SCENARIO
SUBSTITUTE PRODUCT FOR THAT IN EXAMPLE
INPUT DATA FROM DATA BASE
RUN PROGRAMS
Transport, detection, decision and action
?
USE JUDGEMENT BASED ON TEST DATA, EXPERIENCE AND CURRENT USE
EVALUATE CONSEQUENCES COMPARED WITH EXAMPLES
EVALUATE CONSEQUENCES (adequate time to escape)

Figure 2

HAZARD I SOFTWARE


Define Product and Context, Check System Limits (PRODUCT.ONE)
Obtain Property Data (FIREDATA) or Test
Convert Multiple Burning Items To Specified Fire (MLTFUEL)
Input Building and Fire Data For Model (FINPUT)
PRN
Run Transport Model (FAST)
CASE.DAT
CASE.DMP
PRN
Run Graphics Program (FASTPLOT)
Run Decision & Action/Evacuation Model (EXITT)
Obtain Sprinkler/ Thermal Detector Activation Time (DETACT)
CASE.EVA
LEGEND
Automatic Data Transfer
Manual Data Transfer
Data File
PRN Printer Output
PRN
Run Tenability Calculations (TENAB)
PRN
Evaluate Results and Recycle To Next Scenario

Mr. **Walgren**. Thank you, Dr. Snell. We will go through the panel before discussion. We will now turn to Mr. Bragdon.

Mr. **Bragdon**. Good morning, Mr. Chairman and members of the committee. My name is Clyde Bragdon, Administrator of the U.S. Fire Administration. I have submitted written testimony and I will not refer to that in my verbal presentation. The written testimony primarily concerns the budget status of the U.S. Fire Administration that has been submitted and proposed to the Congress.

I am going to confine basically my remarks to the hotel fire safety issue which is before the committee today.

It has happened again. It was and continues to be predictable. The DuPont Plaza fire that occurred mid-afternoon New Year's Eve 1986 in which there were 96 fatalities, scores injured, physically and mentally scarred for the rest of their lives.

I look about this room and I see several people that I know have accumulatively hundreds of years of fire and related experience. I know many of those have been exposed to similar kinds of tragedies, maybe not of this magnitude, but I'm certain in their own minds these disasters are well engraved and yet they continue.

Hotel fires of this significance obviously gain a lot of notoriety. They are predictable. The 1980's have not been a banner decade. I count at least 8 hotel fires in this country of significance and you alluded to those in your opening remarks, Mr. Chairman. That does not include the foreign experience, which is very similar and yet even more devastating.

A few days following the DuPont Plaza Hotel, in China there was another hotel fire where 18 died and 13 were injured. The hotel fire safety record is not one that's particularly enviable except maybe by the industry themselves. There's one hotel fire for every six hotels that's reported in this country, and I suspect a large percentage of hotel fires are not reported to public agencies.

Mr. **Walgren**. Let me ask you to pull the mike in a little bit. These mikes are very directional, and you really have to be quite directed towards——

Mr. **Bragdon**. Is this better.

Mr. **Walgren** [continuing]. Everybody will be able to hear a lot more clearly.

Mr. **Bragdon**. Thank you.

Our data would indicate then that hotel fires on the average present a greater risk to the residents there and/or the guests than they do in any other kind of residential occupancy.

Our National Fire Information Reporting System which reports one-third to one-half of the fires in the United States each year; for 1985 indicates up to 950,000 fires of the 2.4 million; there were 3285 hotel fires in which there were 30 deaths, 331 injuries and a dollar loss estimated at over $31 million, just to indicate some idea of the scope of the problem.

Our particular involvement with this fire, the DuPont Plaza Hotel, came as a consequence of us not having an investigative contract in place at the time of the fire. That service had heretofore been provided by the National Fire Protection Association.

So, in order to serve our particular needs and interests, we formed on New Years Day a national response team, as Dr. Snell has indicated, consisting of the U.S. Fire Administration, the National Fire Academy, and the Center for Fire Research.

Their particular charge was to investigate fire and human behavior only, and not to involve themselves in the criminal aspects of this fire. The invitation to participate was extended by the Bureau of Alcohol, Tobacco and Firearms.

A report of this—these Federal investigative groups will be available and submitted to this committee when completed, which should be in the next few days.

I'm not going to go into any further detail on the fire, because that will be—has been presented to you by Dr. Snell, and I'm certain will be by the NFPA's investigative report as well.

But as a person who has spent his lifetime working fire issues, I find that the fire performed in what was predictable behavior. It was an ordinary fire. There was nothing unusual about it. It just reinforces what we have known for some time. It's a complexity of maybe all of Murphy's Laws being applied all at the same time; if anything could go wrong, it did go wrong.

I might differ in some respects with Dr. Snell in all the ifs he has presented. I don't think many of those ifs would have made a substantial difference on the outcome, when you couple that with public fire response and all the other conditions that existed.

The one if that I will not question in my own mind is that if sprinkler systems had been installed that fire may not have ever been even reported to public agencies, because of the configuration of that ballroom, the proximity of those sprinkler heads would have been, had they been properly installed to the fire load itself.

As a follow-on to the incident, the Governor of Puerto Rico staff in contact with the White House Public Sector Affairs Office had made contact to us and requested recommendations on persons that could serve or members of organizations that could serve on the Governor's proposed Commission on Fire Safety. Such a commission was appointed by the Governor of Puerto Rico in the follow-on days. Represented on that commission from the Mainland, so as to speak, is Dr. Snell, the Center for Fire Research; Mr. Jack Sanders, the former chairman of the board of the National Fire Protection Association and now their West Coast representative; myself; and three members of the New York City Fire Department, all experts in their own specific assignments.

Mr. **Walgren**. Pull that mike down a little bit, so that it really does catch—that's better, I think.

Mr. **Bragdon**. The remaining members of the commission are from the Commonwealth of Puerto Rico.

The goals that the Governor has set forth for us in the Commission was to report on the condition of the codes, regulations and processes that take place relative to residential fire safety in the Commonwealth of Puerto Rico; and to also report on the operations of their fire protection delivery system. That report is in its final draft stage and will be submitted to the Governor of Puerto Rico no later than the 15th of March. And we would be most pleased at the same time to file that report with this committee for their records.

My sense is that, that same Commission could have been created in many of the States throughout this land, investigating the same kinds of event that could have taken place, and unfortunately, may take place in future years.

And some of the things that we have discovered I'd like to sum up for you, because I think they're applicable in all environments, particularly relative to attitudes, the indifference and rationales that have been submitted as a consequence of the investigation. The mentalities, which I will describe them as, are manifestations of this. I'll describe three of them.

One I describe is a concrete mentality. Those who believe that when they build with those kinds of products or have certain kinds of requirements that they are in a fireproof environment. And if they meet the code, everything is fine, that things do not burn.

I submit to you that DuPont Plaza Hotel was a concrete building.

Then we have the fire engine mentality. Those who believe that more is better; that we need more of a reactive stance to take care of these problems. I submit that educational awareness, and public acceptance of and the instilling of responsibility in everybody for the fire problem in this country is the way to go. Certainly we should give that emphasis in our fire prevention activities in the installation of appropriate fire protection systems.

And last, but most importantly, the ostrich mentality; one of avoidance. Persons are inclined to stick their head in the sand and describe the DuPont Plaza Hotel fire as an isolated incident that will not occur again. I think there are many similar situations laying dormant this very minute that could erupt into another major tragedy.

Life safety is not negotiable. Life safety is a bipartisan issue in every political environment. What is the value of life safety? I read a report yesterday that somebody has said in our regulatory world, that $2 million per person is a breaking point for the provision of safety systems. Now, that's research that has been done; and how valid it is, I don't know. But if it cost more than $2 million per person, it's not worth the regulation. That's a sizable amount of money to invest for accepting responsibility.

The after effects, of course, of each one of these incidents, and the people who have the final responsibility for making a decision for change is that everybody will come forward with a better idea. And I think the basic ideas have been in place for a long time, they just have not been necessarily implemented. And they really don't have to be expensive over the term. More is not necessarily better.

There are low cost and no cost items that can be installed in most of our hotel environments; and the more expensive items have offsets that return dividends in future years.

The approach to this must be taken by Government and the private sector in concert with each other. It cannot be a singular issue or responsibility.

There are several means to protect our population, but basically only two of them for emphasis; one is to remove people from danger, and we have many of those systems in place such as: detection, adequate exiting and so forth; or the other is to protect people in place such as what sprinkler technology provides.

Now, one might say that I have a sprinkler mentality. But I'll accept that, because I think it's the most proven and demonstrated technology that we have available to be installed in all environments in which there are life safety problems. NFPA's figures alone, and I don't want to cite something that they may cite themselves, but I will for emphasis clearly state that there has not been a multi-death fire occurring in a sprinklered occupancy in the residential environment. I think that speaks very well of a technology that has existed over a long period of time.

If I could leave with this committee some recommendations on hotel fire safety or any residential fire safety where life safety is involved they would be. Are Federal regulations necessary and required? No. I would not support that position. Fire protection is and should be, and continue to be a state and local responsibility. The standards, the codes, and the technology is available. The decision-making process has to support it and start moving out.

The Federal Government's role should be, to be exemplary in its own fire protection practices. And I think you will find evidence that, that is not always the case.

If there can be economic leverage provided to that particular industry, hotel, then those who travel make a preference to stay in fire protected facilities. That's a good protection feature even for the Federal Government to follow, because I know of no such distinctions that are drawn right now in the Federal Travel regulations for protecting their own human resources.

Obviously, we need to continue our research efforts. But research has to be more than basic. It must be applied. It must be pragmatic. It must be done in concert, and in acceptance by the practitioners for it to move forward.

And finally, maybe an interesting observation, but I think it's time that we need to, again, reflect and review on our codes and standards processes, to see if the public interest is always represented and served in that mechanism and if, in fact, we are getting the best clout for our dollars relative to investment in fire protection systems.

Thank you.

[The prepared statement of Mr. Bragdon follows:]

Mr. Chairman:

I am Clyde A. Bragdon, Jr., Administrator of the United States Fire Administration (USFA). I am pleased to appear before this Committee today. I am particularly pleased that this Committee has seen fit to combine the hearings regarding the reauthorization of the USFA with the discussion regarding Hotel Fire Safety. This is a very topical subject and it clearly underlines the necessity for a Federal fire focus as provided by the USFA.

Fire continues to be a National problem. Fire destroys in excess of nine billion dollars in direct property loss each year and causes the death of 6,200 innocent people and the injury of 110,000 others. Rarely mentioned in the headlines is the fact that 112 firefighters were killed in the line of duty during 1986. About half of these firefighters were people who volunteered to serve their fellow citizens without benefit of regular compensation.

The deaths we recount here are, for the most, not part of the multiple deaths that command our attention such as those that occurred in the recent San Juan hotel fire. These victims are people who die in unspectacular fires in one and two family dwellings in every town in our Nation.

The programs developed by the USFA and implemented through the fire community, the various private sector groups, and public interest groups are designed to function in a systematic fashion to address the multitude of problems facing the Nation regarding fire prevention and protection.

Problems are not solved overnight. We are confident that the leadership and rank and file of the fire community working with the USFA can bring about positive change in the factors that are involved in providing a solution to these problems. The programs of the USFA are not designed to take the place of local initiatives, but rather are designed to provide a Federal focus on the problem and to enhance the local initiatives. We design and implement programs that because of the scale of economy or the multijurisdictional or multidisciplinary nature of the problem cannot be successfully undertaken by the private sector or State and local government.

I have included as part of this statement a listing of selected accomplishments and some significant USFA initiatives. I would like to highlight just one as an example of the USFA's Federal fire focus.

° The National Fire Incident Reporting System (NFIRS)

The National Fire Incident Reporting System (NFIRS) continues to attract a steady increase in the number of reporting fire departments (an excess of 11,500 in 1984 to approximately 12,500 in 1985). We anticipate reports from an additional 1,000 departments in 1986, as a result of the State of Indiana joining the system, and continuing growth of the currently reporting States.

Currently, 40 States are reporting to NFIRS via the National Fire Information Council. In addition, we are receiving data from a number of jurisdictions in two non-participating systems.

In 1985, the fire incident reports generated by the participating jurisdictions totaled more than 950,000. This collection of fire incident specific data gives the USFA the only tool of its kind to analyze the Nation's fire experience and resultant loss of life and property. The generation of these reports constitutes an immeasurable and invaluable contribution by the Nation's fire service and State fire officials understanding and ability to identify the consequences of fire in this Nation each year. The value of the voluntary participation of the NFIRS departments in 1985 has been estimated to exceed $10 million.

As an example, New York State expends approximately $450,000 annually to collect and analyze the data from its more than 1,600 reporting departments--one of which is New York City. Furthermore, New York City is in the process of modifying its reporting system to make it NFIRS compatible.

This is but one of many such activities that are part of the United States Fire Administration's ongoing efforts.

## U.S. FIRE ADMINISTRATION--ACCOMPLISHMENTS/INITIATIVES

### FIREFIGHTER HEALTH AND SAFETY FY-86 ACCOMPLISHMENTS (Highlights)

- Project FIRES: Project Firefighters Integrated Response Equipment System (FIRES) was successfully completed. A final report was produced and distributed. The 1986 edition of National Fire Protection Association 1971 (Protective Equipment for Fire Fighters) was issued recognizing the technical developments accomplished during Project FIRES.

- Residential Sprinklers: A research report on sidewall sprinkler installation was issued and presented before the National Fire Protection Association 13 (sprinkler committee) New Technologies Subcommittee.

An interim report on sprinkler performance under beam and cathedral ceilings has been prepared and was also presented to the National Fire Protection Association (NFPA) Subcommittee.

The findings from these research efforts will be incorporated in the next addition of "The Standard for Sprinkler Installation."

- Northwest Firefighter Mortality Study: The Harborview Medical Center, University of Washington has been retained by the USFA to conduct a firefighter mortality study. This study will analyze death certificates from 1945 through 1984 of firefighters and police officers who were employees of the Seattle, Tacoma, Bellevue and Kent, Washington and Portland, Oregon fire and police departments. The study will also compare the firefighter cohort with the general U. S. population.

  This USFA sponsored study is building onto an existing study stated by the Harborview Medical Center to analyze cancer related deaths within the Seattle Fire Pension Board, Seattle Firefighters Association and the Seattle Fire Department.

  This study will run through March 1987 and may be extended at USFA's option for up to an additional 42 months. Interim results on Phase I of the study have been received on schedule.

- Radio: Short-range communications continue to be a concern among members of the fire attack company. The USFA, in co-operation with NASA, has developed a short-range radio that will allow all members of an attack team to communicate.

  A field test of the radio has been conducted in Dade County, Florida. A field test report is in the final stages of preparation.

- Sizing of Protective Equipment: The size and fit of protective equipment has a dramatic effect on the women's ability to perform firefighting tasks.

  An anthropometric sizing guide for protective clothing and equipment which accomodates female firefighters has been prepared. This document will aid manufacturers in producing equipment suitable for female fire service members.

- Operation Life Safety: Sprinkler systems, coupled with reliable detectional alarm systems have the ability to enhance life safety from fire within buildings. Operation Life Safety (OLS) furnishes technical assistance in establishing life safety programs within jurisdictions. Operation Life Safety has provided this service to over 25 cities. Currently, there are over 200 identified communities in some stage of established life safety systems based on the Operation Life Safety Model.

A resource directory of life safety systems has been prepared and distributed. This document provides a ready reference for technical data on life safety system performance and model legislation to aid local jurisdictions in drafting ordinances to accomplish life safety in the fire community.

A newsletter on Operation Life Safety issues has been established. This allows for an interchange of ideas and program initiatives among the several communities working to achieve enhanced life safety at the local level.

o Project Firesmoke: This project is an interagency agreement with the National Institute of Occupational Safety and Health (NIOSH). The objective of this project is to evaluate the performance of Self Contained Breathing Apparatus (SCBA) by the collection of in-facepiece pressure data, and by the collection of personal and general area samples of airborne contaminants both during and after actual firefighting activities.

The USFA participated in a NIOSH hosted peer review of this project. Hardware for the field work has been developed in-house by NIOSH and other state-of-the-art hardware is being procured. A medical protocol has been added to the scope of the project. Preliminary meetings have been held with the New York City Fire Department, the first department to participate.

o Medical Management of Victims of Smoke Inhalation: The American College of Emergency Physicians (ACEP) under contract to the USFA, has developed a diagnosis and treatment protocol for victims of smoke inhalation. This protocol was based on information obtained from clinical settings, e.g., emergency rooms, throughout the United States. ACEP is preparing to publish the study in its professional journal which will be provided to emergency physicians across the country. The USFA is also publishing the report.

o Hazardous Chemical Suit Research and Development: Hazardous material suit design and performance is an issue when fire service members respond to accidents involving toxic materials.

Field tests have been conducted in Phoenix, AZ; Beaumont, TX; Memphis, TN; and New York City on an advanced suit design developed by the USFA and the U. S. Coast Guard. Specifications have been modified on the basis of these field tests for a second generation of prototypes for field evaluations.

o Staff Activities: American Society for Testing of Materials (ASTM) F-23 Committee on Chemical Protective Clothing : A staff member of the Office of Firefighter Health and Safety chaired the session Emergency Response and Military Applications at the Second International Symposium on Protective Clothing, sponsored by the American Society for Testing of Materials. Staff continued to participate in meetings of this committee providing input to the committee and receiving current information for input to the USFA program to develop superior chemical protective clothing for firefighters.

National Fire Protection Association (NFPA) Subcommittee on Hazardous Chemical Protective Clothing: USFA staff continued to participate in committee activities in furtherance of developing a standard on chemical protective clothing for firefighters.

NFPA Technical Committee on Fire Service Occupational Safety & Health: USFA staff continued to participate in committee activities directed at establishing a national standard for fire department safety and health programs.

Participated in continuing activities of the Fire Combustion Toxicity Group; an interagency group hosted by the Consumer Product Safety Commission (CPSC). Participated in continuing activities of the Federal interagency group working in support of the Memorandum of Understanding for coordination of research on chemical protective clothing and equipment.

- Hazardous Chemical Monitor: The USFA plans to field test a new portable monitor that will quickly detect and identify hazardous chemical vapors, measure, even trace concentrations of the vapors, and sound an alarm of the concentrations that present a health risk. This state-of-the-art monitor was developed by Argonne National Laboratory and will be evaluated as part of an interagency agreement with the U. S. Coast Guard. This ruggedized, easy to use montior will be field tested by fire departments. Preliminary arrangements are being made to have the monitor field tested by a fire department with an active hazardous materials team.

- Chemical Protective Clothing Lab Tests: Interim reports on work being done by Lawrence Livermore National Laboratory for the USFA have been received. The lab work consists of evaluating total encapsulating suits in terms of protection factor and overall suit integrity. This information has been used by the USFA as input to the work of the American Society for Testing and Materials F-23 Committee on Protective Clothing.

  A final report is due June 1987.

FY-87 Initiatives (Selected)

- Interagency Agreement with National Institute of Occupational Safety and Health (NIOSH) to develop a Human Subject Use Test for Evaluating Self Contained Breathing Apparatus: The focus of this work is to determine the performance of Self-Contained Breathing Apparatus (SCBA) while being used under simulated environmental conditions over a wide range of work rates. The method will be the product of an extensive effort that will have included a comprehensive literature search and evaluation of findings, the development of a proposed method for continuous quantitative measurement of SCBA performance, and a human subject feasibility study of the proposed method. The final product will be a detailed procedure to rigorously evaluate SCBA performance while being used by human subjects under simulated conditions of use.

- Firefighter Footware: A research program is underway to advance the state-of-the-art in firefighters foot protection. This research will draw upon the experience of the athletic shoe industry and the military to produce lightweight footware capable of furnishing the wearer protection from the many hazards of firefighting.

- Manual on Hearing Conservation for Fire Departments: A manual is being produced which fire departments may use to establish and guide a hearing conservation program for their members. This manual will illustrate the technical basis for such a program, set forth the requirements, and guide a fire department in achieving hearing protection for its members.

- Physical Fitness and Stress Management: Follow-up testing of fire department personnel who barely passed the entrance physical examination originally, to evaluate their physical condition after some years of service.

  Also, development and field testing of a Stress Management Program for fire department personnel.

## POLICY & COORDINATION FY-86 ACCOMPLISHMENTS (Highlights)

- Alternative Services Delivery: This research effort collected and analyzed information on the use of alternative methods of delivering a wide-range of fire protection and suppression services. The final report discussed trends and actual experiences in areas such as residential sprinkler systems, consolidations, and private sector uses.

- America Burning Revisited: Planning is underway for the conduct of a small, invitation-only workshop to be held in June, 1987 to review the fire problem and recommend future directions for Federal, State and local governments.

- National Volunteer Support: USFA provided grant funds to the National Volunteer Fire Council to carry out a demonstration program aimed at improving communications and information among the Nation's volunteer fire departments.

- Fire Executive Fellowship Program: Continued program for Senior Fire Executives in cooperation with the Harvard/JFK School of Government. Five fire chiefs were provided full fellowships to attend the program for senior State and local executives.

- Private Sector Strategies Project: USFA received the final product of effort aimed at recommending ways for USFA to better interact with and attract support of the private sector for targeted program opportunities.

- Basic Fire Research: Continued joint program with Center for Fire Research on the performance of full scale fire tests on several scenarios including office and mercantile fuel package and fire models work.

FY-87 Initiatives (Selected)

- Consensus Codes Program: USFA intends to expand this effort to include several additional fire and building code organizations as part of our continuing effort to reduce losses through improved codes and administration. The impact of participation by fire service personnel on consensus code committee will be emphasized.

- America Burning Revisited: June 1987 Workshop is on schedule. Final report of workshop will be presented to Congress and the public by late summer.

- Integrated Emergency Management System: Several final products of a cooperative effort with the International Association of Fire Chiefs (IAFC) will be published and distributed to State and local governments including a community leader's planning guide, IEMS local workshop kit, and chief executive officers (CEO) emergency package.

- Fire Safe Cigarette Research Project: A final report to Congress of the interagency effort (U.S. Fire Administration, Health and Human Services, Consumer Product Safety Commission) which required that a technical study on reducing the ignition propensity of cigarettes to ignite upholstered furniture and mattresses will be completed.

FIRE PREVENTION AND ARSON CONTROL FY-86 ACCOMPLISHMENTS (Highlights)

- Residential Sprinkler Retrofit Demonstrations: In cooperation with the Department of Housing and Urban Development, the USFA funded five communities across the United States to complete sprinkler retrofits in multi-family, inner-city buildings. The five communities are: Austin, TX; Prince Georges County, MD; Harrisburg, PA; Boston, MA; and, St. Louis, MO.

  The USFA through a grant to People's Firehouse, Inc., a community based organization in New York City, and the Chinese Community Housing

Corporation in San Francisco, CA, sponsored a project that will demonstrate the effectiveness of retrofitting older, inner-city, multi-family buildings with automatic quick-acting residential sprinkler systems. These cities were selected as examples of cities with extensive building regulations relative to construction and well established inspection programs and bureaucracy. The buildings are occupied by groups identified as part of the USFA targeted populations -- the poor, minorities, and the handicapped.

o Arson/Public Education Resource Directories: Two Directories are being updated to make information available on effective projects for the fire prevention and arson mitigation personnel at State and local levels.

o Cost/Benefit Study on Residential Sprinklers: The National Association of Homebuilders, with support from the USFA, has completed the first part of a two part report on the Cost/Benefits of sprinklers in various residential occupancies.

The final report will cover the range of options available to local governments in the consideration of legislation for sprinkler implementation.

o Community Volunteer Fire Prevention Program: With support from the National Governor's Association, the National Volunteer Fire Prevention Program was expanded to twenty-one States and the District of Columbia. The documentation of successful local projects is underway.

o Public Education and Awareness : The USFA recognizes that changing human behavior is a key element to reducing the loss of life, injury, and property due to fire. The initial campaign of this national effort was kicked-off with a national press conference in November, 1986 in Washington, DC. The first campaign on smoke detector installation and maintenance is meeting with outstanding success particularly in the gaining of private sector support for the program.

The second campaign to be initiated in the summer of 1986, will focus on increased community level efforts through groups such as the Kiwanis, civic groups, and local chapters of fraternal organizations such as American Farm Bureau.

o Reality-based Codes Training Program: The final product of the joint effort with the International City Management Association (ICMA) was made available nationwide. The basic code organization, BOCA, used this computer-based program as a major item in its annual conference in September. The program helps local code investigators understand the economic and human impact of their code decisions.

o Community-based Anti-Arson Program: Twenty-one local community projects were funded in FY-86 with grants ranging from $10,000 to $25,000. An evaluation of this Community Based Organization (CBO) program, currently in its third year, will be completed during FY-87.

- Residential Trailer Demonstration Programs: During FY-86 this program expanded from one trailer, available in the field for use by Federal region grantee, to fourteen trailers available in the ten Federal regions, plus Alaska. As a result of these demonstrations conducted at State capitols, trade shows, and varieties of meetings and conferences, local and State legislation supporting residential sprinkler installation is increasing.

FY-87 Initiatives (Selected)

- Urban/Wildlands Fire Problem: A joint program with the U. S. Forest Service will be initiated in response to problems/issues identified at a national workshop held in Denver in November, 1986. A conference report is currently available. Public education and awareness activities will be carried out in FY-87.
- Public Education and Awareness Campaign : Building on the success of the initial campaign on smoke detectors, a second campaign will be undertaken with a focus on local volunteer activities geared to high risk populations, i.e., minorities, elderly and young.
- Community Volunteer Fire Prevention Program: This program will be expanded by eight States, bringing the total State participation to twenty-nine, plus the District of Columbia.
- Sprinkler Workshops: Twenty-five communities have been selected for the conduct of residential sprinkler workshops which are geared to providing general and technical information to a variety of local participants. This project is being carried out for the USFA by the International Association of Fire Chiefs (IAFC).
- Fire Prevention Incentives: The USFA will convene a small group of fire service personnel to review current local efforts to encourage more fire department fire prevention and awareness programs and to identify incentives that can be used to further local fire prevention activities particularly within fire departments themselves.
- Arson Research and Development: A continuing multi-faceted Research and Development effort is being carried out in FY-87 that includes the following elements: rural arson study, urban arson strike force, Federal arson task force, juvenile firesetters, and prosecutor's guidelines.

## OFFICE OF FIRE DATA AND ANALYSIS

- o The Management Applications Project: The project has completed the National Fire Incident Reporting System (NFIRS) micro-computer software program and has finished the first phase dissemination to four States and a limited number of local fire departments within those States, to test the "systems configuration" options and identify related issues. The Emergency Medical Services (EMS) Incident Reporting System for fire departments is well under way. The Patient Care Report portion of the EMS package, has been enhanced and further refined, the input screen software is completed, and a number of standard reporting output formats have been developed. The fire protection and prevention package input screens have also been completed.

- o The National Fire Information Council (NFIC) Cooperative Agreement: The Agreement has continued to enhance the collection of fire incident data at the local, State, and Federal levels, and to undertake additional initiatives. NFIC developed a residential fire safety slide-tape program which highlights multiple high hazard concerns; a number of NFIC States and metros participated in an extensive Residential Fatality Study which involved follow up surveys of all fatal home fires to get socio-economic data not collected by the National Fire Incident Reporting System (NFIRS) and the organization activity assisted with the first phase dissemination of the Management Applications Project NFIRS Software.

- o "Fire In The United States"- Sixth Edition: The draft was completed in a revised format which will be utilized in subsequent editions allowing easier retrospective year-to-year analysis, and better regional and State level comparisons. This revised format will allow more timely compilation of subsequent editions, and will serve as a model for State fire marshal's annual reports in the future, utilizing the NFIRS standardized data base and reporting elements.

### FY-87 Initiatives (Selected)

- o The Management Applications Project: The second phase dissemination of the NFIRS microcomputer program to an additional ten States is underway. The EMS reports package should be finalized by mid-year and the dissemination begun. The fire protection and prevention reports package should be completed by year end.

- o The National Fire Information Council (NFIC) Cooperative Agreement: The agreement supports the second phase dissemination of the NFIRS microcomputer program by providing State program managers with a comprehensive regional training session (hosted by USFA at NETC) on the program to familiarize them with the operational capacities of the package and to assist them with "uploading" data from fire departments within their jurisdictions which will be utilizing the automated technology. The metro (departments) regional training session will target the identification of hazardous materials data collection needs of local and State NFIRS participants and hopefully yield a framework for enhanced reporting on that topic through NFIRS.

- "Fire In The United States." The seventh edition (1984) is well under way, and work on the eighth edition has begun. The publishing target for the seventh edition is June, and December for the eighth.

The USFA, with strong support from Congress and the Executive Branch, will continue to concentrate on programs that are Federal in scope. We trust that with this team approach we will continue to contribute to the reduction of loss of life and property from fire in the United States.

## The Dupont Plaza Hotel Fire: San Juan, Puerto Rico:

Almost as the San Juan fire burned, FEMA received a request from the White House to offer assistance to the Commonwealth Government of Puerto Rico. FEMA's assistance took several forms. I will address the involvement of the USFA.

Director Becton called me at home and asked that the USFA contact the representatives of the Puerto Rico Commonwealth and offer whatever assistance we could. I immediately contacted my Deputy Administrator and asked him to assemble a team of fire code and fire cause experts.

I spoke with Dr. Snell of the Center for Fire Research (CFR), and together we assembled a team from the CFR and the USFA to go to San Juan.

The Bureau of Alcohol Tobacco and Firearms (ATF) was already on the scene with primary responsibility for the investigation. They extended an invitation for a combined team from CFR, USFA, and the National Fire Academy (NFA) to join them in Puerto Rico.

It was the responsibility of the CFR/USFA team to examine the fire from the scientific and technical aspect. Questions such as: "How did the fire spread? What materials were involved? What was the smoke and flame travel? How did the fire spread so rapidly? What would the effect have been had there been fire protections systems in use? How the structure was constructed?" Other areas too numerous to mention had to be addressed and answered.

The CFR/USFA/NFA team included a person with general fire knowledge, an origin and cause expert, a codes and building construction expert, and scientists expert in the dynamics of fire. The major issue in this fire was: "How did a fire, involving ordinary combustibles, in a building of fire resistant construction result in such a tragedy?" The team that was assembled to answer these questions was unique in that they were all members of the Federal family, they knew of one anothers' expertise, and they were able to be assembled and dispatched in a very short period of time.

Upon arrival in San Juan, the team met with the Special Agent in charge of the ATF team. The team was briefed on the information gathered up until that time. The team then briefed the ATF as to what they would be looking for during their investigation. The Center for Fire Research people examined the dynamics of the fire. That is, they examined smoke and flame travel, soot deposits, flashover phenomena, materials involved in combustion, temperatures throughout the fire, and any other scientific areas that came to their attention. The USFA/NFA team members examined the origin and cause of the fire. After determining this, they began to look at such things as fire travel and how it was affected by building construction, firefighting operations, lack of fire protection systems, and human behavior during the disaster.

USFA was responsible for coordinating this activity with ATF and to evaluate and analyze the data from the fire service perspective. As the team conducted their inquiries and interacted with each other and shared thoughts, ideas, theories and knowledge, it was quite apparent that this unique team was functioning in such a manner that would result in a complete understanding of how this fire reacted. The cooperation between the Federal agencies and the local authorities was outstanding.

The technical information gathered by our team was coupled with that gathered by the local authorities, the FBI and ATF; and, as a result, an understanding of the fire and its results was attained.

The technical and scientific information that was gathered is being compiled into a separate joint report by CFR, ATF and USFA. The report will address, among other things, the following: how this fire spread; why it spread in such a rapid fashion; why people died; and most importantly, it will detail how a fire that developed in ordinary combustibles was able to spread with such rapidity and devastation, claiming 96 lives and injuring 140 people. The report will be released to the general public by the three agencies in the near future.

The USFA and the CFR and other Federal agencies involved in this investigation have seen the value of using expertise available within the Federal family. In fact, this experience has been so successful that we hope the team will be used in the future should the occasion arise.

At about the time the CFR/USFA team returned to Washington, I was asked, along with Dr. Jack Snell, to participate in a Blue Ribbon Panel commissioned by the Governor of Puerto Rico to study what can be done to improve life safety in accommodations on the island. The panel is continuing to deliberate, and we expect to report our findings to the Governor shortly.

The fire in San Juan on December 31, 1986, was the second worse hotel fire to occur in the United States. I do not believe that hotels are a particularly dangerous occupancy, and for the most part, hotel management does have a desire to protect their guests. However, whenever a large number of people are assembled in any one place, we do increase the possibility for disaster. The USFA's National Fire Incident Reporting System (NFIRS) tells us that each year for every six hotels in the U.S. one fire takes place. Hotels, on the average, show a slightly higher risk of death from fires, and the monetary loss is higher than in fires in one and two family dwellings.

An interesting fact is that about 12 percent of fires in hotels do extend beyond the room or floor of origin. These are particularly dangerous fires because they account for 80 percent of the fire deaths in hotels.

In general, fire in the U.S. kills the very young and the elderly more frequently than other age groups. Hotel fires on the other hand, kill most frequently in the 11 to 64-year old range. This is a function of the population at risk in hotels.

I believe we have a long way to go to before we can say that our hotels are providing the optimum in fire safety to their guests. I don't believe that there is any one answer to the problem. We must attack this problem with a systems approach. There must be a balance of public awareness and education, adequate fire codes and enforcement, automatic sprinklers, detection systems, good construction practices, and a desire by management to see that the people responsible carry out their responsibility.

There is a need for a Federal fire focus. Too often the solutions to fire problems are beyond any one Federal agency and well beyond any one State or local jurisdiction to solve. We will continue to seek cooperation and offer cooperation and leadership to other Federal agencies, the private sector, public interest groups, State and local governments and the fire community to find answers to the perplexing problems of fire safety.

The FY1988, the USFA budget, as requested by the Administration, is $2.490 million, including $350,000 for Federal Policy and Coordination; $400,000 for Firefighter Health and Safety; $900,000 for Fire Data and Analysis; $200,000 for Site Administration; and, $662,000 for Salaries.

The Administration, in its commitment to address the budget deficit, is requesting the State and local governments to sustain the programs that have functioned heretofore in partnerships with the Federal government, and the Federal fire focus will remain in those activities which there is a Federal role and could not be supported otherwise.

Federal Emergency Management Agency
Washington, D.C. 20472

## BIOGRAPHICAL SKETCH

## CLYDE A. BRAGDON, JR.

Clyde A. Bragdon, Jr., the Administrator, United States Fire Administration, was nominated for this position by President Ronald Reagan on April 18, 1984, and confirmed by the United States Senate on June 15, 1984. Chief Bragdon retired in March 1984 after nearly thirty-two years in the fire service--the last twenty of which were in management positions.

Chief Bragdon, at the time of his retirement, was County Forester and Fire Warden and Fire Chief of the County of Los Angeles. In addition, he was Fire Chief of the forty-four cities served by the Los Angeles County Fire Department.

He was an active member and officer in several local, state and national professional organizations. He is a graduate of the University of Southern California School of Public Administration.

As Administrator of the U.S. Fire Administration, a part of the Federal Emergency Management Agency, he is responsible for administering the delegated provisions of the Fire Prevention and Control Act, working in concert with State and local governments and private sector organizations through programs designed to reduce this Nation's fire deaths and injuries and property and economic losses from fire.

A native of Massachusetts and long-time resident of California, he and his wife Dal, currently reside in Frederick, Maryland.

3/87

Mr. WALGREN. Thank you, Mr. Bragdon, we appreciate that.

I will turn to Mr. Neville.

Mr. NEVILLE. Mr. Chairman and Mr. Boehlert, I wish to thank you very much for inviting me here today, so that as Superintendent of the National Fire Academy I can explain how the National Fire Academy fulfills its role in furthering fire safety.

I submitted written remarks for the record, and I will only highlight those.

As you indicated in your opening remarks, the National Fire Academy was established by the Fire Prevention and Control Act of 1974. The goals of the Academy are laid out in my written report. But in reference to the opening statement by Dr. Snell, let me indicate briefly that our role is to transfer the lessons learned to those who can make a difference in fire safety. That includes not only fire chiefs, but also building officials, city managers, mayors, and state legislators, for it's not the fire chief who determines what the resources will be for fire protection nor what fire safety legislation will be enacted.

Very briefly, I would like to explain how the National Fire Academy delivers its training and education programs, both on the campus at Emmitsburg and in the field.

Primarily the program on the campus is aimed at those technicians in the field who cannot obtain needed training in other places and at top level managers in the fire service.

Additionally, we coordinate a baccalaureate program which is offered through seven colleges and universities across the country in the area of Fire Safety Administration and in Fire Protection Science.

Almost one-half of those we reach in our field training are volunteers. Very few volunteers attend the academy site for our normal two week programs. However, we do offer week-end programs, and again, nearly half of those attendees are volunteers. There's no guarantee that a high-rise hotel is going to be protected by a paid career fire department. It may well be protected entirely by volunteers who must give of their own time to train and to respond to emergencies.

A tragedy such as the DuPont Plaza Hotel serves as a grim reminder that we have not learned all the lessons that are taught at the National Fire Academy. We must reach more in the fire service on: how to educate the public; how to become more effective in their political environment, in obtaining needed legislation; how to obtain resources that are required, for we realize that it must be a systems approach to fire protection. We cannot, as Mr. Bragdon has indicated, rely only on response.

The lessons of the San Juan fire and other similar fires can and have been used by the National Fire Academy to teach students in a number of areas.

In public education, how to respond in high-rise and hotel fires, emphasizing the need to change public attitudes in order to strengthen fire and lifesafety standards.

In arson investigation, we have learned that we must teach a coordinated investigation. And we must learn how to better use scientific resources at the scene.

In incident command, we will use this fire as we have other fires to point out the need for coordinated command systems, to efficiently use fire department resources at the scene.

In fire prevention, we will emphasize the role of building use and the materials used in the contents of building in determining the type and the extent of built-in fire protection needed. But we simply can't stop at getting the word out to the career and volunteer fire fighter.

As I indicated before, we must extend to those who make final decisions in the areas of fire protection. We are now working to bring city managers in to our audience. This summer we'll have a group of city managers as well as fire chiefs at the academy with a dual goal to expose city managers and other chief executive officers from local government to trends in fire protection and training available at the National Fire Academy.

Concurrently, we will ask those chief executive officers how we can train fire chiefs to be more effective in the political world they work in.

Fire prevention needs to be seen as a life safety priority within the entire community. And we need to expand the training and education circle to include all those involved.

The National Fire Academy is continually looking for ways to increase the numbers and types of people reached. Perhaps, the best example that I can use now would be the interactive video conferences sponsored by FEMA the U.S. Fire Administration, and the National Fire Academy. It has been proven that we can reach as many as 100,000 people and let them speak directly on telephone lines to experts ask questions to focus the subject on their particular problem.

We do use the services of the Center For Fire Research and the United States Fire Administration, both in showing us what we need to teach, and in utilizing, in some cases, their special expertise. As an example, a computer program developed by the Center For Fire Research is currently being used as a part of our instructional program in our fire prevention programs.

I appear before you today to ask for authorization of appropriations for fiscal year 1988, for the training activities authorized under the Federal Fire Prevention and Control Act. The amount requested in the President's budget is $10,021,000.

The funding reflects the continuation of all programs at the National Fire Academy. It does propose a reduction in student travel stipends for students attending on campus courses at the National Fire Academy in Emmitsburg, MD. This reduction will shift some of the costs funded by the Federal Government, to state and local governments or students, if their employers are unwilling or unable to bear the costs.

We believe that asking students or State and local governments to share a greater portion of the cost of training is necessary, in light of the need to reduce the high budget deficits at the Federal level.

I can assure you that this will not lessen the excellence of Academy offerings, either in our field deliveries or those courses taught on the campus.

Mr. Chairman, that concludes my statement. Thank you.

[The prepared statement of Mr. Neville follows:]

STATEMENT OF
THE HONORABLE WILLIAM M. NEVILLE, JR.
SUPERINTENDENT
NATIONAL FIRE ACADEMY
FEDERAL EMERGENCY MANAGEMENT AGENCY
BEFORE
THE SUBCOMMITTEE ON SCIENCE, RESEARCH, AND TECHNOLOGY
OF THE
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES
MARCH 5, 1987

I am William M. Neville, Jr., Superintendent of the National Fire Academy.

Mr. Chairman, it is an honor to appear before you today to report on the role of the National Fire Academy(NFA) in furthering fire safety through our training and education programs.

On a personal note, let me say that this is a very special day for me. This is my first appearance before a Congressional committee since becoming Superintendent of the National Fire Academy in November of 1986. I have spent my entire career in the fire service. Over the years I have participated at the local level in fire programs sponsored by the Federal Government, most recently as Chief in Hayward, California, and before that during my 23 years as a member of the Los Angeles City Fire Department. It is a privilege for me to now be part of the Federal Government in its effort to assist States and local communities reduce this Nation's fire losses.

The National Fire Academy was established over 12 years ago. The Fire Prevention and Control Act of 1974 set out specific goals for the Academy, goals that had been brought to the attention of the Nation through America Burning, the 1973 report of the National Commission on Fire Prevention and Control.

The Report said the National Fire Academy should:

- Help fire departments to reduce injuries, deaths and property losses among citizens and firefighters;
- Increase the attractiveness of fire service careers;
- Assist State and local training programs but not supplant them;
- Make positions in the fire service intellectually more stimulating;
- Assist in the development of effective materials for public education and fire safety;
- Give needed attention to the arson problem; and,
- Bring emerging problems and trends to the attention of the Nation's fire service leadership

I am proud to report that the National Fire Academy is accomplishing many of those goals. But there is still much to do.

As long as men, women and children are being needlessly killed and injured in fires, as long as property losses run in the billions, and as long as America leads the industrialized world in fire losses, our efforts must continue.

I would like to explain how the National Fire Academy works to meet those goals. The Academy is located on the campus of the National Emergency Training Center in Emmitsburg, Maryland. Courses are delivered both on the campus and in States and local communities throughout the Nation. The Federal Government purchased the site in the Spring of 1979. The first classes were held on campus in January of 1980.

In only six years of operation, over 40,000 students from every state in the Union, numerous foreign countries and many Federal agencies have been trained on campus. They have attended a variety of courses designed to advance the skills and professional development of fire service personnel and of allied professionals engaged in fire prevention and control activities, such as arson investigators, building officials, and city managers.

The courses and programs offered on the Emmitsburg campus emphasize professional development for senior and mid-level officers and for technical specialists. Courses of the caliber offered on the campus are not available elsewhere.

Off-campus delivery of courses is the other key element of NFA's training efforts. Nearly 250,000 students have benefitted from programs developed by the Academy and delivered through State and local training programs.

Students are reached by our field programs in a number of ways. "Train-the-Trainer" is one of the most successful programs. State and local fire service personnel are sent to Emmitsburg for intensive instruction in new course material. Once these personnel complete the course requirements, they return home and train both volunteer and career firefighters using NFA-prepared materials. This ensures quality control of instruction and guarantees that students throughout the country are learning the most up-to-date techniques.

Another popular program is the Weekend Educational Opportunities. Courses in general subject areas are offered to fire service personnel, mostly volunteers, who cannot attend the longer NFA courses. Also designed to increase volunteer participation is the State Weekend program. Twelve weekends a year are set aside for 15 States to attend courses on campus. The Academy hosts the weekend and delivers courses selected by the individual State fire training system. For example, the Pennsylvania State weekend will be held June 6-7. The New York weekend was held this last Saturday and Sunday.

This explanation of the goals and programs of the National Fire Academy is important in relation to the focus of today's hearing on hotel fire safety and the lessons learned. By its legislative mandate, NFA must play a key role in preventing fire losses through training and education.

Tragedies such as the Dupont Plaza Hotel fire serve as grim reminders of the lessons we have not yet learned in our States and our communities. Based on preliminary accounts, it looks like there was nothing unique about this fire, except the high number of deaths and injuries. If that is true, then we at the National Fire Academy must examine how available training and knowledge to prevent such tragedies can be utilized more effectively.

The National Fire Academy was represented on the investigation team by a member of our faculty whose area of expertise is fire investigation. His primary role on the investigation team was to evaluate the information that should be incorporated into the Academy's training efforts to help prevent further such tragedies. Having him on the scene will greatly enhance the Academy's response time in incorporating some of the lessons into our curriculum.

The information we have gathered from this fire reinforces the need to emphasize a systems approach to fire protection. That means education, design, enforcement and suppression combined into a total approach.

The lessons of the San Juan fire and other similar fires can and will be used by the National Fire Academy in teaching students in a number of areas, including:

o Public Education - Lessons: teaching people how to respond in highrise and hotel fires. Emphasizing the need to change attitudes to strengthen fire and life safety standards.

o Arson - Lessons: using this recent investigative team approach as a model for incorporating technical resources into on-scene investigations rather than relying on laboratories for evidence testing. Establishing a training block dedicated to coordination of large scale investigations.

o Incident Command - Lesson: using the Dupont Plaza scenario in a classroom setting to underscore the need for incident command system utilization.

o Fire Prevention - Lessons: emphasizing the role of fast acting sprinklers in preventing fire deaths and losses. Highlighting the role of building use and content materials in determining type and extent of built-in fire protection.

o Master Planning - Lesson: Weighing economic cost of fire protection systems versus economic impact of fire.

Those are some immediate ways the National Fire Academy will work to prevent further such tragedies. But those alone are not enough. The key to preventing further such hotel tragedies, in my opinion, is through public awareness. By that I mean that we must take what we know about fire prevention and control and target that information to the proper audiences. We must expand our outreach and our audience.

The fire chief doesn't decide what local building codes will be enacted. The fire chief doesn't decide what resources available to a city will be devoted to fire protection. These decisions are made by local government CEO's and elected officials. Therefore NFA needs to work to strengthen the relationship with local CEO's and elected officials. To foster this needed relationship, the Academy will sponsor a pilot conference of municipal and county CEO's and fire chiefs in July. The goal of this conference is twofold: first, to educate the CEO's in NFA's curriculum and fire protection trends, and second, to learn from the CEO's how NFA can train the Nation's fire chiefs to become more effective in their local management environment.

Fire prevention needs to be seen as a life safety priority within the community. We need to expand the training and education circle to include building officials, members of the insurance industry, architects and builders, educators and elected officials. Not only will this enhance hotel fire safety, but also it will significantly reduce the loss of life and property in residential fires where over 80 percent of the Nation's fire deaths occur.

The National Fire Academy is continually looking at ways to increase the numbers and types of people reached through training without diminishing the quality of the training.

New technology is playing a major role in our outreach and training. Using FEMA's Emergency Education Network, we present training videoconferences several times a year. These videoconferences reach an audience of approximately 100,000, viewing the show live or through taped rebroadcast. Topics have included a series on dealing with hazardous materials, fire service management and public education training techniques. Each show features training segments using experts in the field. A toll free line allows viewers to call in questions to the experts during the program.

At this point, Mr. Chairman, I would request that the National Fire Academy's Annual Report for Fiscal Year 1986 and a report on NFA Initiatives for the Volunteer Fire Service be made a part of the hearing record.

Mr. Chairman, this summarizes the efforts of the National Fire Academy in trying to prevent further hotel fire disasters. Just as the recent fire investigation was a joint effort of federal and local officials, so must finding solutions to fire losses be a joint effort.

The National Fire Academy looks to the Center for Fire Research(CFR) for unbiased scientific research and data that can be used in the classroom. A simulator program developed by CFR is currently used as part of our instructional program. Their role in the major fire investigations is critical to determining what steps we must take to reduce losses. Academy staff works very closely with United States Fire Administration staff. They provide us with fire incident data, with information from research and development programs such as residential sprinklers, and with coordination of federal fire initiatives. Without these two organizations, the impact of the National Fire Academy training programs would be greatly diminished.

The ultimate responsibility for preventing fires and reducing losses lies within each community and State. For that reason, the cost of all National Fire Academy programs are shared among the Federal government, state and local governments, individual students and, in some cases, the private sector. State and local cost sharing with NFA includes: student salaries while in attendance; overtime costs of replacement for student in attendance (intensified by the Fair Labor Standards Act); and cost of food service.

I appear before you today to ask for authorization of appropriations for Fiscal Year 1988 for the training activities authorized under the Federal Fire Prevention and Control Act. The amount requested in the President's budget is $10,021,000. The funding reflects continuation of all programs at the National Fire Academy. It proposes a reduction in student travel stipends for students attending on-campus courses at the National Fire Academy in Emmitsburg, Maryland.

This reduction shifts some of the costs funded by the Federal Government to State and local government or the student if his employer is unwilling or unable to bear these costs.

We believe that asking students or State and local governments to share a greater portion of the cost of training is necessary in light of the need to reduce the high budget deficits at the Federal level.

Let me assure you that this change will not lessen the excellence of Academy offerings.

The National Fire Academy works with a small and dedicated staff to offer excellence in training and education. This excellence will continue. We know we must do more to reach certain key groups including the Nation's volunteer firefighters and the allied professionals. These efforts will continue.

In closing, I would like to commend this Subcommittee for bringing public attention to the hotel fire safety issue. I hope we can encourage that same type of focus and scrutiny for residential, commercial and even Federal office building fire safety.

Fire's greatest ally is public apathy. If we can educate our citizens and enlist their support in the battle against fire, we will save the lives of citizens and firefighters alike. We pledge our efforts at the National Fire Academy to that end.

Thank you.

# NATIONAL FIRE ACADEMY
# RESIDENT PROGRAMS DIVISION

## FY 86 SIGNIFICANT ACCOMPLISHMENTS

The Resident Programs Division was responsible for delivering 162 individual on-campus offerings with 3,796 students attending; and three off-campus offerings with 200 students attending, for a total of 3,996 students.

## I. PROGRAM DELIVERY

o On Campus

3,796 students participated in 162 offerings

All 50 states and 7 foreign countries were represented in the following:

Organizational Status

3,724 Full Paid
58 Part Paid
87 Volunteer
127 No information provided

Rank

359 State Fire Marshals, Chiefs of Department
782 Assistant, Deputy, or Division Chiefs
2,585 Other ranks
270 Other allied professions

All 50 states were represented in the student population, with California having the most (388), and Delaware having the least (5). (See Attachments A and B).

19 students from 7 different foreign countries participated in Resident Programs Division courses: The countries were Australia, Bermuda, Brazil, Bruni, Canada, Israel and Thailand.

Three new courses were fully implemented:

- Fire Service Financial Management
- Command and Control of Fire Department Major Operations
- Command and Control of Fire Department Operations at Earthquakes and Other Catastrophic Disasters

On August 15, Class #2 of the Command and Staff Program graduated after 13 weeks of intensive training. A series of Evening Lecture Series presentations were held in conjunction with the Command and Staff Program. A total of 5 presentations were made to resident students.

A total of 298,830 student hours of activity.

- Off Campus

  The Organizational Analysis and Renewal Program was initiated in the Arlington, Texas Fire Department, the Miami, Florida Fire Department and the Orange County, California Fire Department. The year long process was successfully completed by the Springfield, Illinois Fire Department and the Minneapolis, Minnesota Fire Department. 200 people representing the fire service, government, business and citizens participated in the programs, for a total of 5,000 student hours of activity. All participating organizations identified significant positive change as a result of the program.

  A total of 5,000 student hours of activity.

- Special Programs

  The third FEMA Fire Executive Fellowship Program at the Harvard University John F. Kennedy School of Government was implemented as part of the Executive Fire Officer Program. Five Executive Development III graduates were chosen by a panel, they were:
  (1,080 hours of activity)

  Chief Edward A. Donaldson, Metro Dade County, Florida Fire Department
  Deputy Chief Earl E. Fordham, Los Angeles County, California Fire Department
  Chief Ross A. Fosberg, Anchorage, Alaska Fire Department
  Commissioner Louis T. Galante, Chicago, Illinois Fire Department
  Walter Smittle III, State Fire Marshal, Charleston, West Virginia

  A teleconference entitled "Fire Department Management: Getting to Excellence" was presented on November 13, 1985. A teleconference entitled "Liquified Compressed Gas: Prescription for a B.L.E.V.E. - Part I" was presented on September 5, 1986. Resident Programs Division staff members developed and participated in these teleconferences.

  An estimated total of 391,080 student hours of activity.

- Conferences/Workshops*

  Made presentations at:

  International Association of Arson Investigators (Wausau, Wisconsin)
  National Wildfire Coordinating Group (Ottawa, Canada)
  California Training Officers Conference (Fresno, California)
  Fire Department Instructor's Conference (Cincinnati, Ohio)
  Fire Marshal's Association of North America Conference (Atlanta, Georgia)
  International Fire Service Training Association (Stillwater, Oklahoma)
  Florida Fire Chief's Association Conference (Miami, Florida)
  NFPA Meeting of Technical Committee on Protection Equipment for
      Firefighters (Denver, Colorado)
  Michigan Fire Inspectors Society Conference (Lansing, Michigan)
  International Association of Fire Chiefs Conference (Dallas, Texas)

## II. COURSE DEVELOPMENT

The course development process is comprised of four phases for RPD. A fifth phase is included in the FPD courses.

Phase 1 - Program Team, Task Analysis
Phase 2 - Course Outline, Methodolcgy and Content
Phase 3 - Development of Manuals
Phase 4 - Pilot Testing and Revisions

The following courses are broken down into which phase was completed in FY 86.

Phase 1:
  Strategic Analysis of Fire Administration

Phases 1, 2, 3:
  Strategic Analysis of Fire Prevention Programs

Phases 3, 4:
  Command and Control of Fire Department Major Operations
  Command and Control of Fire Department Operations at Earthquakes and Other Catastrophic Disasters
  Fire Service Financial Management

Phase 4:
  Management of a Fire Prevention Program
  Information Management in the Fire Service
  Introduction to Fire Safety Education
  Use of Microcomputers for Fire Service Management
  Management of Emergency Medical Services

- One curriculum review committee meeting was conducted in the Community Resource Preservation Program area.

- A contract was issued for Richard Howe, an administrator from the John F. Kennedy School of Government at Harvard University; he provided materials on the case study process and conducted meetings with development staff.

- Continued in the coordination of the development of the new Emergency Management Comuputer Aided Trainer (EMCAT) with the assistance of the National Aeronautics and Space Administration (NASA). EMCAT will be used to simulate fire scenarios for fireground management training.

- During FY 86 the American Council on Education (ACE) accredited the following Resident Programs Division courses:

  Introduction to Fire Safety Education - 3 Upper Level Units
  Management of a Fire Prevention Program - 3 Upper Level Units
  Command and Control of Fire Department Major Operations - 3 Upper Level Units
  Fire Service Financial Management - 3 Upper Level Units
  Command and Control of Fire Department Operations at Earthquakes and Other Catastrophic Disasters - 3 Upper Level Units

## III. PROGRAM SUPPORT

- Coordinated the development of the FY 86 NFA course catalogue.

- Developed a new adjunct selection, screening, and in-service training program process for implementation in FY 87.

- 58 new adjunct faculty designees were appointed by the Superintendent and 39 adjunct faculty were released from the approved procurement list for the Division, 33 adjunct applications were rejected, the total adjunct faculty pool at the year's end was 302.

- Completed the Adjunct Faculty Handbook and distributed it to all adjunct faculty members.

- 355 adjunct faculty contractors were utilized for a total of $503,277.

- Participated in the admissions process, providing final review and approval for on campus resident program courses:

  10,386--applications received in FY 86 (up 518 from FY 85)

  1,932--rejected - not qualified

  2,128--rejected - class full

  3,996--accepted and attended (up 153 from FY 85)

  58--no shows/without notice (down 27 from FY 85)

  585--no shows/with notice; 306 substitutions

- Staff served on inter - and intra-agency committees and task forces. (See Attachment C)

ATTACHMENT A

### RESIDENT PROGRAMS DIVISION
### FY 86 ON-CAMPUS PROGRAMS
### NUMBER OF PARTICIPANTS BY STATE
### (RANKED BY STATE)

| | |
|---|---|
| California | 388 |
| Florida | 338 |
| Washington | 246 |
| Texas | 241 |
| Virginia | 168 |
| Maryland | 155 |
| Colorado | 144 |
| Pennsylvania | 122 |
| Arizona | 116 |
| Illinois | 114 |
| Utah | 108 |
| Indiana | 105 |
| Wisconsin | 103 |
| Oregon | 94 |
| North Carolina | 86 |
| Michigan | 81 |
| Ohio | 80 |
| Missouri | 79 |
| New York | 77 |
| New Jersey | 70 |
| Minnesota | 67 |
| Massachusetts | 64 |
| Kansas | 64 |
| Oklahoma | 63 |
| Alaska | 57 |
| Tennessee | 55 |
| Alabama | 54 |
| Montana | 52 |
| New Hampshire | 50 |
| Connecticut | 45 |
| Louisiana | 44 |
| Iowa | 44 |
| Nevada | 41 |
| Kentucky | 32 |
| Nebraska | 29 |
| New Mexico | 28 |
| West Virginia | 28 |
| Georgia | 24 |
| Idaho | 24 |
| Wyoming | 23 |
| South Carolina | 22 |
| Maine | 21 |
| South Dakota | 19 |
| Mississippi | 19 |
| North Dakota | 16 |
| Rhode Island | 14 |
| Vermont | 13 |
| Arkansas | 13 |
| District of Columbia | 10 |
| Hawaii | 9 |
| Delaware | 5 |

| | |
|---|---|
| Virgin Islands | 2 |
| Puerto Rico | 1 |

ATTACHMENT B

# RESIDENT PROGRAMS DIVISION
# FY 86 ON-CAMPUS PROGRAMS
# NUMBER OF PARTICIPANTS BY STATE

| | |
|---|---|
| Alabama | 54 |
| Alaska | 57 |
| Arizona | 116 |
| Arkansas | 13 |
| California | 388 |
| Colorado | 144 |
| Connecticut | 45 |
| District of Columbia | 10 |
| Delaware | 5 |
| Florida | 338 |
| Georgia | 24 |
| Hawaii | 9 |
| Idaho | 24 |
| Illinois | 114 |
| Indiana | 105 |
| Iowa | 44 |
| Kansas | 64 |
| Kentucky | 32 |
| Louisiana | 44 |
| Maine | 21 |
| Maryland | 155 |
| Massachusetts | 64 |
| Michigan | 81 |
| Minnesota | 67 |
| Mississippi | 19 |

| | |
|---|---|
| Missouri | 79 |
| Montana | 52 |
| Nebraska | 29 |
| New Hampshire | 50 |
| Nevada | 41 |
| New Jersey | 70 |
| New Mexico | 28 |
| New York | 77 |
| North Carolina | 86 |
| North Dakota | 16 |
| Ohio | 80 |
| Oklahoma | 63 |
| Oregon | 94 |
| Pennsylvania | 122 |
| Rhode Island | 14 |
| South Carolina | 22 |
| South Dakota | 19 |
| Tennessee | 55 |
| Texas | 241 |
| Utah | 108 |
| Vermont | 13 |
| Virginia | 168 |
| Washington | 246 |
| West Virginia | 28 |
| Wisconsin | 103 |
| Wyoming | 23 |

| | |
|---|---|
| Puerto Rico | 1 |
| Virgin Islands | 2 |

| | |
|---|---|
| Australia | 1 |
| Bermuda | 6 |
| Brazil | 1 |
| Bruni | 2 |
| Canada | 7 |
| Israel | 1 |
| Thailand | 1 |

ATTACHMENT C

## RESIDENT PROGRAMS DIVISION

Inter - and intra-agency committee/task forces that National Fire Academy Resident Programs Division personnel served on in FY 86.

Source Evaluation Board - NETC "Umbrella" Contract

Joint Public Safety Awards Board

FEMA IEMS Steering Committee

Fallen Firefighter Memorial Committee

FEMA Hazardous Materials Task Force

NETC Affirmative Action Program Plan Monitoring Team

FEMA Earthquake Education Steering Committee

FEMA K-12 Curriculum Committee

Assistance with NFPA "Learn Not to Burn"

NETC Recreation Association

Emergency Management Computer Aided Instruction (EMCAT) Project

Teleconference, coordination of campus and FEMA meetings

NETC Long-Term Evaluation Committee (with Office of Programs & Academics)

National Wildfire Coordinating Group

USFA "Sesame Street - CTW Project"

FEMA National Defense Executive Reserve Program

Chemical Manufacturer's Association/Association of American Railroads (workgroup recommended terms for personnel protective clothing)

DOT Committee for Revision of the Emergency Response Guide

ATTACHMENT D

NATIONAL FIRE ACADEMY
RESIDENT PROGRAMS DIVISION
FY 86 CLASS DONATIONS

| CLASS | DATE GRADUATED | DONATED TO | AMOUNT |
|---|---|---|---|
| Fire Arson Investigation | 10/11/85 | Shriner Burn Institute | $215.00 |
| Hazardous Materials Tactical Considerations | 10/11/85 | Baltimore Regional Burn Center | $350.00 |
| Hazardous Materials Tactical Considerations | 11/1/85 | St. Jude's Hospital Memphis, TN | $125.00 |
| Hazardous Substance Specialist | 11/8/85 | Baltimore Regional Burn Center | $165.00 |
| Interpersonal Dynamics in Fire Service Organizations | 12/13/85 | Vigilant Hose Company Emmitsburg, MD | $100.00 |
| Management of a Fire Prevention Program | 1/17/86 | Baltimore Regional Burn Center | $ 75.00 |
| Chemistry of Hazardous Materials | 1/17/86 | Baltimore Regional Burn Center | $110.00 |
| Strategic Analysis of Fire Department Operations | 1/17/86 | Shriner Burn Institute | $220.00 |
| Fire Prevention Specialist II | 1/17/86 | Shriner Burn Institute | $111.00 |
| Use of Microcomputers for Fire Service Management | 1/17/86 | Fallen Firefighter Memorial Fund | $ 50.00 |
| Hazardous Materials Tactical Considerations | 1/31/86 | St. Jude's Hospital Memphis, TN | $135.00 |
| Fire Arson Investigation | 2/7/86 | Shriner Burn Institute | $140.00 |
| Fire Prevention Specialist I | 2/14/86 | Shriner Burn Institute | $150.00 |
| Hazardous Materials Tactical Considerations | 2/28/86 | Baltimore Regional Burn Center | $210.00 |
| Fire Arson Investigation | 2/28/86 | Shriner Burn Institute | $ 89.00 |
| Fire Prevention Specialist I | 3/14/86 | Shriner Burn Institute | $250.00 |
| Executive Development III | 3/14/86 | Shriner Burn Institute | $300.00 |
| Hazardous Materials Tactical Considerations | 3/28/86 | St. Jude's Hospital Memphis, TN | $250.00 |
| Fire Arson Investigation | 3/28/86 | Shriner Burn Institute | $140.00 |

ATTACHMENT D
(continued)

| CL | DATE GRADUATED | DONATED TO | AMOUNT |
|---|---|---|---|
| Introduction to Fire Safety Education | 4/18/86 | Shriner Burn Institute | $100.00 |
| Chemistry of Hazardous Materials | 4/18/86 | Largo Medical Center for Heart Research, Florida | $125.00 |
| Fire Arson Investigation | 4/18/86 | Shriner Burn Institute | $100.00 |
| Hazardous Materials Tactical Considerations | 5/2/86 | St. Jude's Hospital Memphis, TN | $115.00 |
| Fire Arson Investigation | 5/9/86 | Shriner Burn Institute | $100.00 |
| Hazardous Substance Specialist | 5/9/86 | St. Joseph Hospital Burn Unit Fort Wayne, IN | $100.00 |
| Fire Prevention Specialist II | 5/23/86 | Shriner Burn Institute | $100.00 |
| Chemistry of Hazardous Materials | 5/30/86 | Baltimore Regional Burn Center | $100.00 |
| Management of a Fire Prevention Program | 5/30/86 | Shriner Burn Institute | $100.00 |
| Executive Development III | 5/30/86 | Mother Seton School Emmitsburg, MD | $150.00 |
| Plans Review for Inspectors | 6/13/86 | Shriner Burn Institute | $ 85.00 |
| All classes | 6/27/86 | Babe Ruth Baseball League Emmitsburg, MD | $382.00 |
| Command & Control of Fire Department Operations at Earthquakes & Other Disasters | 7/18/86 | Shriner Burn Institute | $116.00 |
| Management of a Fire Prevention Program | 8/15/86 | Shriner Burn Institute | $210.00 |
| Plans Review for Inspectors | 8/15/86 | Shriner Burn Institute | $ 75.00 |
| Fire Arson Investigation | 8/15/86 | Shriner Burn Institute | $150.00 |
| Fire Arson Investigation | 9/26/86 | Shriner Burn Institute | $200.00 |
| Fire Prevention Specialist I | 9/26/86 | Burn Center Tampa, FL | $138.00 |

ATTACHMENT E

NATIONAL FIRE ACADEMY
RESIDENT PROGRAMS DIVISION
FY 86 PROGRAM DELIVERY

| | | No.of Students | | | | No. of Student |
|---|---|---|---|---|---|---|
| | No. Deliveries | Career | Vol | Other | Total | Hours |
| On-Campus: | 162 | 3,524 | 87 | 185 | 3,776 | 298,830 |
| Off-Campus: | | | | | | |
| Organizational Analysis/Renewal | 3 | 200 | - | | 200 | 5,000 |
| Fire Exec. Fellowship | 1 | 5 | - | - | 5 | 1,080 |
| Teleconference | 2 | | | | 130,000 | 390,000 |
| TOTAL | 168 | 3,729 | 87 | 185 | 133,981 | 694,910 |

# National Fire Academy
## Field Programs Division

## FY86 SIGNIFICANT ACCOMPLISHMENTS
(October 1, 1985 - September 30, 1986)

The Field Programs Division was responsible for coordinating 305 individual off-campus direct course deliveries and 84 on-campus deliveries, for a total of 389 course deliveries to 12,135 fire and rescue personnel from across the Nation. In addition, the division supported 2,168 course deliveries at the state and local level by providing instructional materials and student manuals through the Academy's Train-the-Trainer program. Total number of deliveries was 2,557, reaching 71,107 fire and rescue personnel; 42,196 or 59% were career personnel and the balance, 28,904 or 41%, were volunteer.

### I. COURSE DELIVERY

NFA Direct Delivery

Working with and through the state fire training programs, Academy courses were delivered in every state in the union. There were 305 state level deliveries to over 9,000 fire and rescue personnel. In addition, the campus was set aside on twenty-five weekends to provide educational opportunities for those who could not attend course deliveries during the week. During these weekends, sixty-seven courses were delivered to over 3,000 students. Students participating in the On-Campus Weekend course offerings were from twenty-six (26) states, with several from as far as California.

Train-the-Trainer

There were 2,168 deliveries at the State and local (S&L) level by S&L instructors, utilizing instructional packages which were developed, field tested, and "handed off" by the NFA. Through this program an additional 59,000 fire and rescue personnel participated in educational opportunities that utilized the Academy-developed materials that were "handed off" to the state and local fire delivery system through the Train-the-Trainer program.

## II. Training Resources and Data Exchange (TRADE)

Established in 1984 by the Academy, TRADE provides a network to improve communications and information exchanged among fire training officials at all levels of government. The TRADE network operates through a regionally based system built around the ten FEMA regions. The regions conduct periodic meetings hosted by State and local participating agencies.

The Academy provides grants to each region to foster regional TRADE activities. Some results of these TRADE grants are:

Region II: Presently purchasing phone modems for regional communications via computer.

Region III: Conducting regular regional meetings with one-day presentations by participating agencies on various State and local programs; e.g., AIDS and emergency rescue, emergency trauma, communications, hazardous materials, etc.

Region V: Developing a resource catalog of exemplary fire service training programs from within the region.

Region X: Due to geographical distances between agencies; i.e., Alaska, the region conducts calls, rather than meetings, on a quarterly basis.

To further foster TRADE activities at the national level, the Academy sponsors two types of conferences bi-annually; the national TRADE conference and the co-chairs conference. The first national conference was held in FY85 with a second one planned for FY87. The first national TRADE Co-chair conference was conducted in FY86 on October 29 - November 1, 1985. In attendance were two co-chairs elected to serve as representatives for their respective regions. The attendees discussed with NFA senior staff many issues of concern to the fire service in an open forum and shared resources, ideas, and exemplary programs with one another. The next Co-chair meeting will be held in FY88.

## III. TRAIN-THE-TRAINER (TtT)

The fifth annual NFA Train-the-Trainer Program was conducted, and . . .

(a) Two Building Construction instructional packages were "handed-off":

Building Construction: Principles, Wood & Ordinary Construction
Building Construction: Non-Combustible & Fire-Resistive Construction

(b) 161 senior fire service instructors participated, representing:

| | |
|---|---|
| 48 | State Fire Training Systems |
| 108 | Metropolitan Fire Departments |
| 4 | Military Services |
| 1 | Trust Territory |

Voluntarily reported to the NFA were 2,168 course deliveries at the local level by local instructors utilizing educational packages previously handed off through TtT--over 59,000 fire and rescue personnel participated in these training opportunities during FY86.

Voluntarily reported to the NFA that since the inception of the TtT program in the fourth quarter of FY82, there had been over 6,000 course deliveries at the local level to over 150,000 fire and rescue personnel.

Over 275,000 student manuals were printed and shipped to TtT participating fire training agencies at the local level in FY86. This quantity is to support the balance of FY86 and anticipated local FY87 TtT couse deliveries.

## IV. DISTRIBUTION SYSTEM FOR ACADEMY TRAINING PACKAGES

All NFA packages that are "handed off" to the S&L level through the NFA's TtT program are also made available through the National AudioVisual Center (NAC) for purchase by the fire service and allied professions.

The NAC is the central information and distribution source for training and educational material produced by or for the United States Government. An interagency agreement was negotiated with NAC to reproduce and distribute NFA "hand off" training courses. Over 2,500 NFA instructional packages, and over 9,000 student manuals have been purchased from NAC.

To date, 12 Academy TtT instructional course packages are available through NAC:

Building Construction: Non-Combustible & Fire Resistive Construction
Building Construction: Principles, Wood & Ordinary Construction
Conducting Basic Fire Prevention Inspections
Fire/Arson Detection
Fire Service Supervision: Increasing Personal Effectiveness
Fire Service Supervision: Increasing Team Effectiveness
Hazardous Materials: Incident Analysis
Hazardous Materials: The Pesticide Challenge
Instructional Techniques for Company Officers
Public Fire Education Planning
Recognizing and Identifying Hazardous Materials
Volunteer Fire Service Management

In addition to the TtT "hand off" packages, Fire Fighter I, developed by a consortium of state fire training systems, under the guidance of the NFA, has also been made available through NAC.

## V. CONTRACTOR DEVELOPED/CONTRACTOR DELIVERED COURSES

Field Programs Division continued to support the "Learn Not To Burn" (LNTB) elementary school fire safety curriculum workshops in cooperation with the National Fire Protection Association. A new fire safety curriculum for high schools, "Fire Safety for the Rest of Your Life," was introduced in FY86.

Contractors conducted 65 "Learn Not To Burn" workshops with over 2,400 participants; 4 "Fire Safety for the Rest of Your Life" workshops with 60 participants; and 19 workshops for both programs for over 600 participants.

Total activity was 88 workshops and 3,075 participants. Also, 2 workshop/conferences were conducted for the LNTB regional representatives at Emmitsburg, Maryland, and Quincy, Massachusetts.

A cooperative agreement with the National Association of State Directors of Fire Training and Education was initiated to conduct an updating survey of the 1981 National Fire Academy Publication, Directory of State Fire Service Training Systems.

A contract for the updating of the Directory of Metropolitan and Large City Fire Departments Training Systems was made with Slosky and Company. The project is to be completed by Fall, 1987.

The grant/cooperative agreement with Burns Concern to deliver workshops for counseling juvenile firesetters (under age 7, and ages 7 to 14) expired December 30, 1985. Under this agreement a total of 25 workshops were conducted in 19 states with a total of 833 participants.

The Open Learning Fire Service Program (OLFSP) continued to show growth in program enrollment. In FY86, a total of 2,231 enrollments were recorded in the 12-course curriculum offered by 7 participating institutions throughout the country. This is a 34% increase in enrollment over FY85. A milestone was reached in the second semester of this year when the program had over 1,000 enrollments. Total enrollments since the program of Fall, 1979, is approximately 10,000.

## VI. COURSE DEVELOPMENT

The Academy received formal accreditation this year from the American Council on Education (ACE) of one credit hour for four Field courses:

Building Construction: Principles, Wood & Ordinary Construction
Building Construction: Non-Combustible & Fire-Resistive Construction
Fire Service Supervision: Increasing Personal Effectiveness
Fire Service Supervision: Increasing Team Effectiveness

The uniformly positive comments received from ACE about the Field course materials, and the unqualified endorsement of these courses as college level materials, continues a precedent set in FY85 which promises important opportunities for growth in the national impact and application of the Academy Field Programs curriculum.

State Fire Training Agencies formally recognize quality of NFA field courses--22 State systems have adopted various field courses for State level fire/rescue certification programs.

The Academy's on going efforts in support of firefighter safety, fire prevention, and emergency management issues were continued with development, revision, and release of the following programs. These efforts included the selection, procurement, and management of program and development teams; pilot testing and field testing of materials; tracking text; and media production.

Phase 5 - TtT hand off preparation:

Building Construction: Principles, Wood & Ordinary Construction
Building Construction: Non-Combustible & Fire-Resistive Construciton

Phase 4 - Revised courses:

Preparing for Incident Command
Commanding the Initial Response
Community Fire Defenses: Challenges and Solutions
Fire Risk Analysis: A Systems Approach

Phase 2 & 3 - New courses in development:

Firefighter Safety and Survival: Planning & Implementation
Initial Company Tactical Operations
Multiple Company Tactical Operations

Phase 1 - Planning and needs assessment:

Leadership curriculum, including proposals for:

Leadership I: Personal Size-Up/Inventory
Leadership II: Directing, Coaching, Supporting, & Delegating
Leadership III: Decision-Making, Risk-Taking, & Problem Solving
Leadership IV: Applying Leadership Skills

Advanced Leadership V: New-Age Thinking for the Fire Service
. Executive: Ethics, Values, Creativity, & Vision

## VII. PROGRAM SUPPORT

National Fire Academy Adjunct Faculty Handbook. The Field Programs and Resident Programs divisions jointly developed a comprehensive National Fire Academy Adjunct Faculty Handbook to assist instructors in the performance of their instructional and administrative responsibilities before, during, and after each course delivery. The Handbook defines the specific responsibilities for both Resident and Field programs adjunct faculty. It also covers the responsibilities and requirements associated with the federal procurement process for adjunct faculty contractors, as well as associated administrative and professional responsibilities. The Handbook's use has resulted in smoother procurement and administrative activity and has assisted in assuring a quality course delivery in the field.

Prepared and distributed over 2,100 Program Notices to State and metropolitan fire protection agencies, adjuncts and special groups regarding NFA initiatives in course delivery, special services, public education, etc.

Assisted in the preparation of FY87 NFA course catalog.

There were 384 adjunct faculty contractors utilized in support of programs for a total cost of $212,205, or an average adjunct cost per course delivery of $553.

Additional grant funds totaling $35,000 were awarded to each region of the TRADE network. A major improvement in grant monitoring was achieved in FY86. Beginning in FY87, all ten regions will operate with synchronized periods of performance and reporting requirements, thus eliminating problems associated with monitoring ten different delivery dates.

Negotiated and maintained an Academy Planning and Assistance Program (APAP) grant to the State of Montana for the development of a comprehensive statewide fire education and training plan for

Montana. This grant has resulted in a 5-year plan for the State's fire services training and education system. The Plan lists State goals, objectives, and recommendations for improving the competency levels of the fire service personnel throughout Montana.

The Division completed the Guide for Preparing and Implementing State Fire Training and Education Plans and distributed it nationwide to all the participating organizations in the TRADE network.

Provided staff assistance to NETC Office of Programs and Academics for development of NETC five-year curriculum plan.

Program Delivery versus Staffing--in the past six years, the NFA Field Program activity has expanded dramatically from a base in FY81 of 13,054 student days to over 1,058,000 student days of activity in FY86. In this same period, the number of program deliveries has increased from 236 in FY81 to 2,711 in FY86.

This outreach activity has been accomplished with no increase in full-time permanent personnel since FY81. In fact, the overall Division staffing level decreased in both FY85 and FY86--there was a loss of two clerical positions and one professional position in FY85, and a further loss of two professional positions in FY86.

Travel--in FY86, a total of 24 trips were made by staff for out-of-state programs review, and 8 were made for local travel--aggregate cost of all divisional travel--$7,937.35. Number of out-of-state trips to monitor Academy program activity increased by 70% over FY85 level; i.e., 24 trips versus 7 trips.

J. Faherty Casey
Deputy Superintendent for
Field Programs Division
National Fire Academy

# ACADEMY PROGRAM INITIATIVES
# FOCUSED TOWARD
# THE VOLUNTEER FIRE SERVICE

## BACKGROUND

Based upon two national surveys conducted by the Academy in 1982 and 1984, it is estimated that the national fire service community is approximately 1,200,000 personnel. Of this total, the career service represents approximately 20%, or 240,000, while the volunteer sector is 80%, or 960,000, personnel. It was the intent of the commission who authored America Burning (1972), and the subsequent legislation of Public Law 93-498 (1974), that the Academy should focus its instructional program on the educational and skill needs at the company-grade officer level and above. This focus has been an issue of importance and discussion at several national conferences over the past seven years. The participants at these conferences have included the directors of the 49 State fire training programs; the chief training officers of the 127 major-size fire departments in the Nation; **the membership of the National Volunteer Fire Council, including delegates from 42 of the 50 states**; members of the Academy Board of Visitors; and representatives from the 13 national fire organizations which comprise The Joint Council of Fire Service Organizations.

Over the years, the Academy has had a very positive interface with the volunteer fire service community. This has developed into a very effective, result-oriented program linkage with the National Volunteer Fire Council and, through this, the volunteers at the local level. This on-going relationship has included, but is not limited to, the following:

**1979** **Stonebridge Conference (SB-I).** Defined the needs and priorities of the American volunteer fire service regarding training, information transfer, Federal assistance, hazardous materials, arson, personnel issues, community relations, business management, and emergency medical services, to mention but a few of the overall issues/concerns (43 in all) identified.

**1980** **Stonebridge II (SB-II).** Furthered the spirit of a new sense of mission and importance whereby previously identified issues were classified; and new ones, such as image improvement, recruitment/retention, motivation, and performance standards, were raised.

From Stonebridge II, a **Financial Management Manual was developed expressly for volunteer fire departments**, which provides model procedures and techniques to the Fire Chief and Chief Administrative Officer of volunteer fire departments.

**1982** **Executive Committee of the National Volunteer Fire Council** met on campus with management of both the National Fire Academy and the U.S. Fire Administration. The purpose of this meeting was to review in detail the recommendations from the national Stonebridge I and II conferences and determine the progress toward achieving these recommendations.

Recommendations: The Academy should develop a two-day field course in Fire/Arson Detection and Fire Service Management. These courses should be handed-off to the State training systems through Train-the-Trainer (TtT).

Actions: In 1983, the courses, Fire/Arson Detection (F/AD) and **Volunteer Fire Service Management** (VFSM), were handed-off through the Academy TtT. **As of December, 1986, there have been 1,611 deliveries of F/AD to 46,949 personnel; and 207 deliveries of VFSM to 4,072 fire officers at the State level.**

Recommendation: The Academy should concentrate hazardous materials training efforts on "incident management" and delivery through the Train-the-Trainer program.

Action: In 1984, the Academy handed-off through the Train-the-Trainer program three hazardous materials training packages. As of January, 1987, personnel who have been trained by State and local instructors using the Academy-developed and handed-off materials are as follows:

| Course Title | Number of Deliveries | Number of Personnel Trained |
|---|---|---|
| Hazardous Materials Incident Analysis | 977 | 25,770 |
| Hazardous Materials Pesticide Challenge | 376 | 8,981 |
| Recognizing/Identifying Hazardous Materials | 1,196 | 28,600 |
| **TOTALS** | **2,549** | **63,351** |

1984 **Stonebridge III**. Further advanced the needs, priorities, and mission of the volunteer fire service toward a network of information sharing and professional growth, from previously identified issues of SB I and SB II, that were deemed essential in providing the most professional level of service to the citizenry.

## Direct Delivery of Academy Field Courses

The primary purpose of the National Fire Academy Field Programs Division is to develop and field-test, under realistic conditions, and in all parts of the Nation, the instructional materials that ultimately will be handed-off to State and selected local fire training systems through the Academy's Train-the-Trainer program; and be placed with the National AudioVisual Center for national distribution. The Field Programs Division maintains an extensive system to deliver these courses in cooperation with State and local fire training systems. Large-scale delivery of these courses prior to the Train-the-Trainer release affords the opportunity for a truly national evaluation by the participants, State sponsors, and adjunct faculty. These evaluations form the basis for revision of the materials in preparation for national release.

Academy field courses have been offered in every State since 1981. **The courses are 16 hours in duration, and usually are offered on weekends to accommodate volunteer and career fire and allied professionals who may find weekday attendance difficult to schedule.** The courses are short-term, intensive training experiences, designed to provide a maximum opportunity for student participation near their home departments.

### Academy Direct Deliveries at the State and Local Levels
### 1980-1986

| FY | COURSE DELIVERIES | STUDENTS | CAREER/% | VOLUNTEER/% |
|---|---|---|---|---|
| 80 | 42 | 1,310 | 538/41% | 772/59% |
| 81 | 161 | 6,549 | 2,562/40% | 3,947/60% |
| 82 | 254 | 11,441 | 6,149/54% | 5,292/46% |
| 83 | 298 | 12,180 | 6,334/52% | 5,846/48% |
| 84 | 456 | 16,184 | 10,519/65% | 5,665/35% |
| 85 | 406 | 13,093 | 8,510/65% | 4,583/35% |
| 86 | 389 | 12,272 | 7,542/61% | 4,730/39% |
| **TOTALS** | **2,006** | **73,029** | **42,154/58%** | **30,835/42%** |

## Train-the-Trainer Program

Under the Train-the-Trainer concept, model training courses are developed and field-tested by the National Fire Academy. Then, one senior fire service instructor from each [illegible] selected local fire service training systems is brought to the Academy and familiarized with the course materials and methods of delivery. Upon completion of this Train-the-Trainer workshop, the Academy-trained instructor returns to his/her home jurisdiction to train other instructors and end-users, using the National Fire Academy-developed materials. In this way, a cadre of instructors trained to teach these Academy courses is established within the State and local fire training systems. The State and local systems receive tested course materials to strengthen, supplement, and integrate into their fire training curricula.

Since 1982, 12 training packages have been handed-off to the State and local fire service training systems. **As of January, 1987, there have been over 6,000 deliveries of these training courses to over 147,000 fire and rescue personnel. Approximately 67,500, or 46%, of the participants at the local level have been from the volunteer fire service community.**

## FUTURE

### Expanded Educational and Training Opportunities 1987-1988

- **Initiate a home-study program**, utilizing self-directed educational materials. Several of the Academy's two-day courses (12-16 content hours) would be ideal for conversion into self-study packages. These courses, in their present format, have been evaluated by the American Council on Education and have been recommended for college credit.

  Benefit: Would make Academy educational opportunities accessible to a larger number of fire and rescue personnel, particularly those from volunteer departments who experience difficulty in attending field or resident deliveries.

- **Restructure selected two-week Academy resident courses** to include only essential need-to-know information and deliver same on a regional basis. It is estimated that several of the present 10-day courses can be revised to 6 days and formatted into three, 2-day modules. **With this new format, the course could be offered on three consecutive weekends throughout the country.**

  Benefit: While attendance would still represent a significant time commitment, it nevertheless could make attendance at an Academy indepth educational opportunity a reality for many--which at this time is but a dream.

- **Fire Executive Leadership Forum**--Design and implement a series of two-day, information and resource exchange opportunities that will be offered on campus at the Academy and on weekends.

  Benefit: This initiative will allow chief officers from volunteer departments to attend the Academy and exchange information with regard to the challenges that volunteer personnel encounter; and it will assist the Academy in designing its educational services to better serve this sector of the Nation's fire service community.

- **National Teleconference**--For the past two years, the Academy has conducted several teleconferences focusing on challenges and solutions facing the fire service. These conferences have been broadcast during the morning and afternoon time periods. The current broadcast time period makes it very difficult for volunteer officers to participate in these educational events. **The Academy is exploring the possibility of evening-hour teleconference time periods.** While this appears to be a very simple program decision, such is not the case. Evening hours are considered prime time; therefore, it is a very competitive and expensive time period.

  Benefit: Expand the viewing audience to include thousands of personnel who cannot participate during daytime broadcasts because of employment schedule conflicts.

## Expanded Information Exchange

- The National Fire Academy's Training Resources and Data Exchange initiative (TRADE) is a regionally based networking system designed to foster the exchange of fire-related training information and resources among the Federal, State, and local levels of government. Currently, the 176-member national network includes the directors of 49 State fire service training systems and senior executive training officers from the Nation's 127 largest fire departments. Fire department TRADE representatives are from the largest fire department in each State, plus those metropolitan fire departments protecting populations greater than 200,000 and/or having more than 400 uniformed personnel. There are 10 regional TRADE networks. The objectives of the regional TRADE networks are: 1) identify fire and rescue training needs within the region; 2) identify exemplary training programs within regions, reproducing and exchanging those resources among the TRADE networks; and 3) provide an annual assessment of fire training resource needs within the region, together with recommendations as to how the National Fire Academy can better support State and local fire training systems.

  **Working with the National Volunteer Fire Council (NVFC), it is proposed that a delegate chosen by the Council who resides within each of the TRADE regions be designated to represent the NVFC at the regional meetings.**

  Benefit: While the directors of State fire training systems now represent, and would continue to represent, the interests and training needs of the volunteers within the TRADE regions, the addition of an NVFC representative would increase the awareness of special educational/training challenges that are faced by the members of the volunteer sector. Also, such representation would provide a direct means of communication between the NVFC and the designated State and local fire training systems that strive to meet the training needs of all fire professionals--both career and volunteer.

- **Stonebridge IV Conference**--It has been approximately three years since the last national conference was convened to explore the needs of the volunteer fire service community. These conferences have been an extremely beneficial means for exchanging program information and identifying future trends that impact on the Academy's programs [illegible] Nation's volunteer fire and rescue service community. These [illegible] jointly sponsored and designed by the National Fire Academy and the National Volunteer Fire Council. In attendance were representatives and staff from both the Academy and the U.S. Fire Administration, **plus the NVFC delegate from each State in the Union.**

  Benefit: Review Academy programs and direction with the volunteer community at large; discern and receive guidance from the volunteer sector concerning educational and training needs; and ensure that future Academy program planning is designed to meet these needs to the maximum extent possible within available human and financial resources.

Mr. WALGREN. Thank you for your presentations.

One thing that strikes you in this instance in particular is that there was no effective response able, it would seem to me, that from the newspaper accounts I read, it was like a bomb that went off, from the standpoint of those in the casino. And no matter whether you had a fire engine standing outside the door, there was no way that emergency response teams, in the sense of somebody coming in there with some kind of equipment, would have changed the outcome for any of these individuals.

Is that your impression as well, Dr. Snell?

Mr. SNELL. Yes, sir. In fact, as you know, most of the people who die in fires in this country, as you said, die in homes, and that typically is the case in home fires as well.

Mr. WALGREN. And so this really does focus you on some kind of change in their environment prior to the fire, some kind in the situation before the fire that is the safety measure which we really need.

Can I ask, then, how each of our programs that we're working with in the Federal Government is directed toward that kind of safety measure?

In particular, with regard to the academy, how much of our total effort at the academy is on response versus some kind of development of measures that are in place before the fire?

Mr. NEVILLE. At this time, there is a slight advantage, if you will, in the number of classes taught in fire prevention over fire control. That will probably increase as we see more and more fire chiefs and local officials understand the importance of those courses, because to a certain extent, we have to deal with what our constituency tells us that they need in training.

However, I can tell you that even in the classes that are taught in control, we find that the less built-in fire protection there is in place, the greater the need and the greater the cost for a response mechanism. Therefore, we try to show that direct correlation. I think it's something like you might have heard on TV commercials, "You can pay me now or pay me later."

Mr. WALGREN. Well, I guess this is the old argument of whether the emphasis should be on prevention or whether the emphasis should be on response, and we've put so much—so many people in this country do, and rightly so, spend so much effort to have the response there, because the response is in pursuit of saving an individual life, and many are saved, and yet we lose so many in fire, it's obvious that response does not solve the problem.

And how can we—how can we develop a greater appreciation of the prevention side?

Mr. BRAGDON. There's a whole series, I think, of initiatives that have to be continually addressed and reinforced. I don't think it's an argument or a debate that fire prevention should always win that one, and fire prevention certainly is directed towards changing the public attitude that prevails in this country on the indifference towards fire, the casual situation that it is always going to occur to someone else. And therefore we continue to reinforce our response or reactive mechanism and not give the kind of attention that we should to the whole spectrum of fire prevention, which includes public education and awareness, the appropriate kinds of codes and applications of standards.

We just have to keep pounding that message, and I think it's the decision-makers back even in our local communities. Unfortunately, to this day, as they are, suffering reduction in their economic ability to address public service, some of the most—and always it seems to be that the first kind of services that go are the preventive kinds of services.

The fire communities themselves contribute, I think, to that dilemma. We've had many successes, but we also have to take credit for a lot of failures in that regard.

We have right now a window of opportunity to prolong that, and after every major tragedy, that window is opened for a very short period of time in which there is some reaction and some steps forward are made. The MGM fire, for example, was a classic. Throughout this country, a lot of activity took place, but it's waned rapidly, and we are now repeating that process.

My own sense is that Puerto Rico is just too far away to keep that up. You don't read that in the newspaper anymore, and they're on to other issues.

It's good that we do have an inclination to forget tragedy, but we should never forget the lessons of tragedy and its application.

Mr. **Walgren**. Do you feel that we many make a real mistake in getting—in thinking about public education as a whole, in that I have to, it seems to me—my sense tells me that we should accept the fact that the public will be indifferent. I'm indifferent, and I can, you know—I have small children in my house, and I can take you down to the basement and probably point to things that shouldn't be there or situations that are almost a hazard. I trust they're not a pure hazard, but I'm not sure.

And if I'm indifferent, for God's sake, what about most in this society? But who should not be indifferent that we should be able to, with discipline, understand we can reach, are those people who you suggest are decision-makers, and they should be able to be reached through a focused program that has—that has discipline and money in it.

I can't get it out of my mind that Japan lives in these paper houses and loses no people, and they do that, I understand, because they have a very intensive, comprehensive system of fire inspection that goes through those homes and contacts those people and talks to them, and for that moment, those people are not indifferent. My guess is that two weeks later, they may very well be, but in the meantime they change the physical circumstances that they're living in.

My question, I guess, is, shouldn't we have a—literally a focused national effort on getting the attention of the decisionmakers in these communities?

The city managers are those, that's true, and I'm glad to see you bringing them into the Fire Academy. But in my several years, I've never heard of city managers going there. I wish I had thought of that. It's not a hard thing to think about, if somebody sat down and thought about it, but you get the impression that no one is really, on the Federal level, taking responsibility for forcing this issue with those who are in the decisionmaking control of facilities around the country.

Mr. **Bragdon**. I think we can cite many programs that are successes, and that's why my reference, probably as many efforts, though, that are failures.

I frequently state that the fire service spend much of its time talking to itself, that they have not reached out and embraced other groups and people into forming coalitions of interest to identify the problem.

We set up a system in our society that somebody takes care of all of your needs, and therefore that's the Fire Service's responsibility, to take care of the fire problem. And yet the fire problem impacts all elements of our society, some more severely than others.

For example, you talk about your own family situation. The most impressionable age to teach or ingrain fire safety is in the formative years in the school environment. And I commend those schools and those systems that use the programs that are now available through them to make that impression at an early age. You may have the opportunity to learn from your own children by bringing that message home.

That's our investment in the future, to try to reverse and change some of the attitudes that we have in the society that somebody is going to take care of your every need, and it does not occur, in some cases, because it comes too late.

So I am going to be very high on that kind of public education aspect to try to turn it. I think the Japanese experience you mentioned, the heavy emphasis they have on fire prevention, but you did not mention the heavy involvement of the citizens themselves.

Here when we have tragedy, we all have sympathy and sorrow. In other kinds of societies, they say, "You nearly jeopardized my family and my life because of your carelessness" and so forth, an entirely different public response to tragedy.

Mr. **Boehlert**. Would the chairman yield on that point?

Mr. **Walgren**. I'd be happy to yield.

Mr. **Boehlert**. What do we expect from the American public? I mean, they look to Washington and see what's being proposed in this budget, a 50-percent reduction in the budget for the Center for Fire Research, a 60-percent reduction in your budget, and only a modest 10-percent reduction in your budget. I mean, that's absolutely crazy.

What would you think if you were out there in beautiful upstate New York or in Central Pennsylvania and say, "Well, there's no real problem. We don't have to spend any more money. Look, the Federal Government is proposing to drastically reduce the budget for the Center for Fire Research. It must be we've done all the researching we need to do." That's unmitigated nonsense.

Dr. Snell, you said we've got to communicate, educate, and motivate. My question of all three of you, and it's question we constantly ask: How do we communicate, educate, and motivate the Office of Management and Budget? [Laughter.]

We've heard your message, and we're with you, and I can guarantee you, as much as is humanly possible by one member of one subcommittee, that the significant reductions proposed for your budgets will not be approved by this subcommittee under his leadership with my support. That's an insurance policy.

But how do we do it?

Dr. Snell, I mean—let me ask you this. Maybe it's sort of unfair, and I have a habit of asking unfair questions. But what was your initial budget proposal before it got chopped up along the way? Would you care to share that with us?

Mr. SNELL. I really wasn't privileged to make a budget proposal. The guidance we have is to accept the guidelines, and the budget was prepared on that basis.

Mr. BOEHLERT. Well, I think we should be relieved that at least this year they're asking for something for you. They only want to cut you 50 percent. Last year, they wanted to eliminate you.

I'm sorry, Mr. Chairman. I'm impinging on your time. But we have some very strong feelings about this up here, and I just think your presentations are outstanding, and when my turn comes, I'll have some more questions.

Mr. WALGREN. Well, I guess I'd like to raise one point. My wife's reaction to the fact that 95 percent of the hotels did not have sprinklers was—and I remember it specifically; she said, "I thought that was a right that I had." She would have walked into that hotel and assumed they were there.

And what I get out of this is that apparently with all our approach of model codes and all the talk of sprinklers and everything like that, it just hasn't gotten down or out to people who are in a position to put the right into place or the assumption that people are making into place.

Now I gather that would require some kind of heavy code emphasis among a very small community, and I do appreciate the public education aspect of it, and I know there's tremendous good done in that. And my boy comes back and he can recite, "stop, drop, and roll." And that might save his life or from terrible scarring or something like that sometime.

But I also realize that we thought the sprinklers were there, and it's that gap that I would like to try to focus on. It's said that when there is a tragedy, there is a window of attention that you might be able to use to really focus the decision-makers on standards and codes.

Do you think that's a possibility at this point in terms of federally strengthening code—I hate to say the word "requirements," but expectations, so that those decision-makers out there will know when they're failing?

Apparently Puerto Rico didn't even know it was failing.

Mr. BRAGDON. I would prefer not to comment specifically on the Puerto Rican situation at this time, other than you have identified maybe not a particular person, individual, organization at fault, but a system at fault that allowed a DuPont Plaza Hotel fire to occur.

That same system failure resides in many places in this country and throughout the world. The education, to me, is the introduction to the system, and people who accept that part of it will see that the built-in fire protection systems, the appropriate codes and standards that are waiting in the wings to be utilized, and the technology is there to be adopted; therefore, my reference to the people who have courage at the local and state level to adopt those things.

Now I realize the retrofitting of our built environment is most difficult, not impossible, but difficult. But we don't have to continue the agony by continuing to build—and there's an awful lot of new structures, vulnerable structures, in this country right now that have been built in recent years without the appropriate life safety provisions, from my perspective.

We have to learn.

Mr. WALGREN. Other thoughts, Dr. Snell?

Mr. SNELL. Yes, sir. I think Mr. Bragdon has made a couple of very important observations here.

Retrofit of the existing building stock is crucial in achieving the objective that you're talking about. It's perceived as being excessively costly.

Why? I think one of the reasons is, many people believe that you must retrofit each building to meet all of the requirements that are on the books.

Let's think about those requirements. Those requirements have evolved over the years as a result of a succession of fires. In many instances, the owner of a building or a local regulatory official may not be clear as to just what set of measures may be needed, fire protection measures may be needed, to achieve a given level of fire safety. In most instances, again as Mr. Bragdon has pointed out, more is always—is not always better. It isn't always necessary to do it all.

What we need, I think, is a systematic assessment of our existing building stock to identify—and this can be done cooperatively between the public and private sector, because obviously the greatest burden of responsibility here rests with private sector building owners—but we have the technology to provide the tools to measure, to assess the current level of fire safety or fire risk, if you will, or hazard in existing buildings, to identify those in various occupancies that demand attention.

That would give local authorities and fire and regulatory communities targets to work with. Working together, I believe very reasonable packages can be put together to bring these buildings under control.

Later in the morning you are going to hear from a corporation that has made it a policy to do this, and it's my sense that they're not throwing money away. It's my sense that it's good business. They perceive it as good business.

So I think an assessment of this sort, using the kinds of measurement tools that are available to identify the high-risk occupancies clearly and openly would be an important step in getting this process going.

Mr. WALGREN. The gentleman from New York?

Mr. BOEHLERT. In order to coordinate, you have to have somebody quarterbacking that assessment program.

Mr. SNELL. Well, I think there are many institutions in place, both in the public and private sector, that would be very willing to pull together to make that kind of an activity work.

The organizations represented here, I presume, would certainly be active participants. The National Fire——

Mr. **Boehlert**. You mean represented right here at the table?

Mr. **Snell**. Yes, sir.

Mr. **Boehlert**. Well, how can we expect you to do that? We want to slash your budget.

Mr. **Snell**. Well, you'd have to rethink that part of it, sir. [Laughter.]

Mr. **Boehlert**. I've already rethought it. I've already rethought it. I'm on your side.

But, I mean——

Mr. **Snell**. Other important participants are national private sector fire organization, such as NFPA, the International Association of Fire Chiefs, and others. CABO, the Council of American Building Officials and others.

Those organizations, I believe, would pull together quickly to respond to that kind of a challenge.

Mr. **Boehlert**. Let me ask you, what did it cost your budget this fiscal year for this important investigation? Do you have a figure?

Mr. **Snell**. We estimate that we've probably put in about three man-months of effort, which may put that on the order of $30–$35,000 investment.

Mr. **Boehlert**. OK. How about your budget?

Mr. **Bragdon**. Our basic effort thus far, because they are doing obviously the scientific followup, would be the investigation itself and the follow-on report, so we're probably more in the neighborhood of about $5,000 to $6,000. It's a modest amount.

Mr. **Boehlert**. I'm just wondering if, God forbid, we had a similar tragedy in FY '88, with your budgets proposed for decimation, if you'd be able to even conduct the type of investigation you've conducted.

Let me first confess that I'm a smoker. I'm not proud of it. But with that out of the way, are tobacco-related accidents a prime cause of fires?

Mr. **Bragdon**. Yes, sir. The use—and smoking materials—are the leading cause of fire. There are some variables in different state configurations. For example, heating, alternate heating devices, in some environments, would replace smoking, but smoking materials primarily overall is the leading cause of fires.

Mr. **Boehlert**. You know, I just did some quick figuring, and your three budgets, the total request for FY '88, is in the neighborhood of $15 million, which would be down from $22 million this year—let me stress, we're not going to allow that, but that's what's proposed—about a $7 million difference—you know, that's the revenue from one penny excise tax on a pack of cigarettes for about two weeks.

Would you think we ought to start a user fee, maybe a one cent per package of cigarettes excise tax dedicated to a fund—Center for Fire Research, U.S. Fire Administration, and the National Fire Academy. At your current funding levels, one penny excise tax would take care of your budgets for the next 10 years.

Am I frightening you with that suggestion? [Laughter.]

Mr. **Bragdon**. I gave up smoking 2 years ago. [Laughter.]

So I don't plan on contributing. [Laughter.]

Mr. **Boehlert**. Mr. Neville, Superintendent, let me ask you, would the proposed reduction in your budget, not as significant percentage-wise as with the other two sharing table—are you going to be able to accommodate more students at the National Fire Academy when there's an obvious need to do a better job of education?

And incidentally, let me stress to you that I think the Fire Academy does an outstanding job. We've both been there. We've been through it all, and I'm very much impressed.

But there is an obvious need, at least I perceive it, for more education to bring firefighters from around the country, volunteer and paid, because they're all professional, expose them more to your programs.

What are going to be the consequences of a budget reduction for you in fiscal year 1988, if we permit it, and two, a drastic reduction in the stipend program?

Mr. **Neville**. Experience would indicate that we would have fewer students on the campus. We will probably continue to reach more firefighters and related professionals through our field program.

Mr. **Walgren**. Let me—there is a vote on the floor that we ought to respond to. Mr. Price will be back directly, so if you would just sort of be prepared to reassemble when he arrives, he will then have some questions for you and call the next panel.

We will be right back. Thank you.

[Brief recess.]

Mr. **Walgren**. Let's resume sitting, and if the panel would return.

The Chair recognizes Mr. Price.

Mr. **Price**. Mr. Snell, I wonder if we could just pick up on one matter in your statement which was discussed to some extent earlier.

You talk on page 8 at some length about what sprinkler systems of various sorts might have—what difference they might have made and, of course, also referred to the fact that the technologies to install such systems are either too costly or perceived as too costly by many hotel operators.

Do you have any estimate what it would have cost to install an adequate system in the DuPont Plaza Hotel?

Mr. **Snell**. Mr. Price, I think there are others here better qualified to speak to the cost of installation of such systems, so I will defer to the people who have experienced that directly. You're going to be hearing shortly from Mr. Scarff, for example, from the Marriott Corp., who has extensive experience in that area and can give you a more direct answer to your question.

Mr. **Price**. Is there anyone on the panel that could give a rough estimate? I know a lot would depend on the exact quality of the system, but any ballpark estimate you could——

Mr. **Bragdon**. Well, sir, you've made a reference to "system," and I think that's most important. In the occupancy in question, because in that environment they do have reservoirs, fire pumps built in. They had a standpipe system, so you—they had the basic part of the system in place. You just needed to extend water to the public spaces and individual rooms. Now that's not a scientific or technical response.

Another factor that Mr. Scarff may explain to you is the loss of revenue when you're taking the installation out of service, potentially to the hotel. You have to add that into cost.

Technology and systems nowadays can minimize that, so you're not losing revenue while you're retrofitting and occupancy, but I can't give you more specifics beyond that, and I think he will, based on the wide range of experience that they have had in Marriott Corp.

Mr. PRICE. All right. We'll take that up with him.

On the question of code-making, I wonder what comments any of you would care to make about the general adequacy of the code-making system, as we see it today, and what suggestions you'd make for practical improvements?

Mr. BRAGDON. Let me try to handle that. We have a process which I think has served jurisdictions well over the years where there are standards-making bodies who feed their information into code-making organizations. This is what we describe as a consensus process.

The Fire Administration, in part, supports that effort. If I had to make a comment at all because of the nature of public interest, local participation have not had the funds or the mechanism to participate appropriately in that process. So I would suggest strongly that there be some better balance. But the process does serve well, and it is a good consensus, where industry, the private sector, and government come together, but it still needs some attention, I think, with greater public participation, and that's really an economic matter, back to those who should be participating from state and local government.

Mr. PRICE. Could you describe how that process works with respect to local code-making bodies, how that input is achieved.

Mr. BRAGDON. The next panel, of course, will have code experts. But the primary consensus organization for fire standards in this country is the National Fire Protection Association. They do this through a very elaborate and extensive committee structure in which representatives that I earlier referred to from industry, from the public sector, and from other interest groups serve on those committee structures. They bring their various points of view into that, and therefore they make recommendations in that standards-making process, which is passed upon by their entire membership for inclusion into a standard.

Those standards then are passed on to the code-making organizations for direct adoption or adoption by reference as a standard and are used extensively throughout this country by all the code bodies.

Mr. PRICE. I wonder if you could comment, again in a general way, as to what you see is the Federal Government's role in all this in promoting fire safety. I think this tragedy has raised that question, and I wondered what your general view would be on that.

What is the specific federal role?

Mr. BRAGDON. I believe firmly that the framers of the Federal Fire Prevention and Control Act were alert to the appropriate Federal fire role and fire focus, by serving as a catalyst, a clearinghouse, a coordinator to increase the capacity of State and local government, at all times recognizing, though, that fire protection is a responsibility at those levels; to do those things that jurisdictions in and by themselves cannot afford to do, and that's particularly evident in the research area. Some of the research activities that have been conducted in recent years. For example, on the residential sprinkler system development, new technology based on old technology, has been primarily funded by the Federal Government and then passed on to the users and manufacturers.

Individually, that probably would not have been done, at least to the extent it was done with Federal participation, at no time interfering with the responsibilities of State and local government, but providing them a collective means, I guess you might say, and a collective role to do things they would not be able to do individually.

Mr. **Price**. Dr. Snell, I understand you have something to add on the code question?

Mr. **Snell**. Yes. I think the emergence of better understanding of fire, scientific and technical data about fire incidents, and ways to quantify both fire hazard and risk are having a very powerful effect on standards and code-making processes within the country. Obviously, the more we know about the subject, the firmer the grip, the more direct the relationship of codes and standards to the actual risk to society.

The adoption and use of tools such as the sort we've just described, embodied, for example, in the National Fire Protection Association's Life Safety Code as a means to make quantitative tradeoffs among the different fire safety alternatives is an excellent case in point.

The activity involving that organization [NFPA] and the Council of American Building Officials is paving the way for greater use of these quantitative tools is another evidence of this change.

Another example would be the increased involvement of registered engineers, fire protection engineers in fire safety evaluations and in the code-making process.

A reasonable analogy to what I'm describing would be the structural safety industry. Up until a decade or so ago, codes and standards relating to structural safety were largely prescriptive in nature. The codes told you how to make the structure, so that it would be safe. Now they're performance codes, because the scientific knowledge is there for designers, registered engineers, to design them safely.

You are entering into the era of that same capability in fire protection, and the impact of that on the codes and the code-making processes will be very significant.

Mr. **Price**. So you have a great deal of confidence that the codes that are being developed and refined will do the job in the future.

Obviously, there's a gap, though, between that and——

Mr. **Snell**. I was speaking to the capability. I wasn't talking to the drive or the motivation, and I think many of Mr. Bragdon's comments and many other comments from the committee are more pertinent to that issue.

This area does deserve attention. The total cost of fire, $30 billion a year. It's hard to find an area where the return on investment is greater than in improving fire safety.

Mr. **Bragdon**. I might add to that, there is one important ingredient left out of that equation. You can have the best codes in the world, and if they're not properly enforced, they're meaningless.

Mr. **Walgren**. Could you comment on that, on the kind of enforcement you see across the country and the extent to which that is the problem?

Mr. **Bragdon**. Well, obviously we would agree and support voluntary compliance, insofar as it can be taken. But somebody still has to serve the public interest to see if voluntary compliance is taking place.

We have witnessed in the Puerto Rican situation, in their code process there, they have a certification process. There is no public inspection or plan approval in the enforcement of their codes. It's all done by the builder, if you will, the permitees certification that, they, he has, in fact, complied with the code. Whether that's true or in evidence is not know through self-certification.

I would hope there would be some appropriate balance between that. But who looks out for the public's interest in that particular equation?

Mr. **Price**. Thank you, Mr. Chairman.

Mr. **Walgren**. Thank you, Mr. Price.

Mr. Boehlert?

Mr. **Boehlert**. Am I correct that there is no Federal or national fire code, Dr. Snell?

Mr. **Snell**. There is no Federal fire code. There is a—you could view the model codes as national codes, as indeed they are, and the increasing coordination between the three major national model code organizations, through the Council of American Building Officials, is moving us in the direction of a national consensus code.

Mr. **Boehlert**. But the model code doesn't require anyone to do anything.

Mr. **Snell**. Oh, no. There's no authority there. That's just a resource.

Mr. **Boehlert**. Well let me ask you this: Are we in the Federal Government, are we as hypocritical with fire code adherence as we are with so many other things? I mean, don't we exempt ourselves in federal buildings from local fire codes?

Mr. **Bragdon**. Oh, I love this one. [Laughter.]

Because my background obviously is from local government.

I don't think we have a common system. I think you will find in the Federal family, the GSA, for example, has basic responsibility for government-owned buildings unless they are, in fact, owned by the agency or department themselves.

So you may have a full variety. But as they interface with the local community, I think in many respects we do have a problem.

When the Federal Government puts structures and buildings in the local community, there is some expectation that that local community is going to provide public fire protection for those, but there's also an attitude that prevails throughout the Federal Government that they comply only with their own standards, and the public agency having local responsibility can have no input into that.

Now that's not universal. Some positive relationships have, in fact, been established by local government and the Federal Government in that particular environment. But it's certainly not universally applied. In fact, sometimes there are some very difficult feelings between local government and Federal Government, who impose this burden locally.

My inclination would be, obviously because the Federal Government does use references to model codes and model standards, so they're certainly upbeat in that respect. I think they could take further steps.

But there has to be a stronger relationship established with the local people relative to inspection and compliance, if they have that obligation to provide protection.

Mr. **Boehlert**. You specifically in your statement expressed opposition to any federal code relating to hotels. Would you expand upon that a little bit?

And, Dr. Snell, I would like you to address that and also Mr. Neville.

Mr. **Bragdon**. Well, we certainly have a system in place that I've described, relative to model codes and standards, that are applicable if they are adopted at the local level.

Mr. **Boehlert**. But they don't do anything for anybody except give some guidance.

Mr. **Bragdon**. That's right.

Mr. **Boehlert**. And most people seem to ignore it.

Mr. **Bragdon**. But if the Federal Government were to, in fact, suggest such a system, then obviously they would have to put a compliance system into place. So you're talking about a very extensive system.

Now you would be preempting State and local responsibilities who already have systems of varying degrees in place to do that, and I don't know if that's an appropriate Federal role, other than to support them in whatever kind of efforts we can do through research, technology development, and supporting the process that they're already involved it.

We would be establishing—I guess we'd be establishing something similar to what we find in our Occupational Safety and Health Administration rules.

Mr. **Boehlert**. We exempt ourselves there, too.

Mr. **Bragdon**. Well, that's true.

Mr. **Boehlert**. We're the biggest hypocrites in town. We pass all these laws and say they apply to everybody else except us.

Mr. **Bragdon**. There are some fine exceptions to that, where I find—in the Defense Department, a couple of agencies are stepping out with new technology and trying to move it forward, but it's not universal again.

Mr. **Snell**. I would like to go back in responding to that question to my earlier comment of communicating, educating and motivating. If we provide the means for doing those things, then the rest of it will take care of it, itself.

Mr. **Boehlert**. When you say, we, do you mean the Federal Government?

Mr. **Snell**. We the major participants. Yes, there's an important role for the Federal Government; and there's an important role for industry and private sector organizations.

I think, for example, of the activities in the last decade in energy conservation. It didn't take a direct Federal effort to motivate people, to insulate their homes at the time they were in line for gasoline or experiencing enormous jumps in fuel prices. They got the message.

They also got, from the Federal Government research laboratories and others, clear concise technical information about how to respond in their own self-interest.

Mr. BOEHLERT. But, Dr. Snell, in all fairness, in that instance they got the message because at the end of each month they could see a saving on the utility bill. I would venture to say, as the chairman observed earlier, that most of us think that a fire is not going to involve us in any way, shape or manner, so we go about our daily business.

Mr. SNELL. That's largely because we aren't communicating very effectively to you.

Mr. BOEHLERT. And I want to help you communicate, but I wonder how can we communicate if we slash your budget.

Mr. SNELL. Well, the chances are that you or somebody you know—you or somebody you know is probably going to die from fire. That's the level of the problem that we're talking about.

The chairman used to use the example of the fire death rate being like two 747's colliding monthly, and so on.

I keep coming back to the fact that when we experience a hazard; when we experience the difficult situation, we learn something that we never, never forget. Pilots do this all the time safely on simulators. Kids are getting some information about fire in schools. Hotel owners aren't learning about the horror of fire in their properties; they don't have the slightest idea, most of them, certainly, obvious exceptions, about the hazards that—or just the liability that they're sitting on.

No. I think we have quite a ways to go in communicating and educating about the hazards of fire. It's not just pamphlets in a hotel room. The things that we've been doing haven't scratched the surface. And your comments are the best evidence I have of that.

Mr. WALGREN. Well, somehow we're going to have to scratch the surface. I wish we had more time. I want to thank you for your presentations, and we will be talking to you.

Mr. BOEHLERT. Thank you, sir.

Mr. SNELL. Thank you very much.

Mr. WALGREN. Let's have the second panel. I'm sorry, the time is getting away from us. But the second panel is made up of John Gerard, representative of the National Fire Protection Association. Mr. Gerard is accompanied by Thomas Klem, the director of Fire Investigations and Applied Research with the National Fire Protection Agency; and Jim Lathrop, who is a Life Safety Code specialist with the National Fire Protection Association as well. And also on this panel is Robert Miller, the Fire Code Coordinator of the Western Fire Chiefs Association.

Gentlemen, welcome to our discussions. And written statements will be incorporated or reproduced in the record because there are many people other than us here today who want to see what is said about this issue in full; and your statements and submissions in writing will be part of that, and it would leave you free to focus on those points that really cry out for being raised at this point. And we are glad you are with us. And let's start with Mr. Gerard.

## STATEMENTS OF JOHN C. GERARD, WASHINGTON REPRESENTATIVE, NATIONAL FIRE PROTECTION ASSOCIATION, ACCOMPANIED BY THOMAS J. KLEM, DIRECTOR, FIRE INVESTIGATIONS AND APPLIED RESEARCH, NATIONAL FIRE PROTECTION ASSOCIATION; JAMES K. LATHROP, LIFE SAFETY CODE SPECIALIST, ENGINEERING SERVICES DIVISION, NATIONAL FIRE PROTECTION ASSOCIATION; AND ROBERT V. MILLER, FIRE CODE COORDINATOR, WESTERN FIRE CHIEFS ASSOCIATION, INC.

Mr. **Gerard**. Thank you, Mr. Walgren.

It's a pleasure, once again, to appear before your committee, but the circumstances of the hearing are not exactly joyful.

The National Fire Protection, of course, has had as its mission since 1896 the safeguarding of people in their environment from destructive fire.

Since we were founded, we have been recording data and collecting information, all of it in an effort to try to understand and explain why fire continues to be such a major cause of death and injury and property loss in the United States. Over that time we've learned a lot, and I think we've communicated very much. And a lot of the information that we've learned has come from our internationally recognized Fire Investigations Program. This program has been going on for the past 40-years.

We originated the concept of a multi-disciplinary investigation team; and I think it's significant that that's a process that today is universally recognized as a very, and probably the most effective way of developing a competent analysis of a major fire.

One of the earlier uses of that concept was in our investigation of the MGM Grand Hotel fire in 1980 with the Bureau of Alcohol, Tobacco and Firearms.

Mr. Klem and Mr. Lathrop will address some of the technical aspects of the Puerto Rican hotel fire. But besides the technical mission, NFPA also has, and is very committed to an extensive and comprehensive program of public education, which has been mentioned as one of the keys to resolving this issue. Our program is called, Learn Not To Burn. In fact, our illustrious chairman mentioned, stop, drop and roll, which is one of the learning behaviors in the Learn Not To Burn campaign.

Learn Not To Burn Program includes a national media campaign, the fire safety curriculum for school children, as well as an extensive outreach program supported by a regional field network of representatives. And the work and training of that regional network is partially supported every year by the National Fire Academy. I think it's one of the areas where we have been working well together for many years.

One element of that outreach program is a poster contest that we have going all the time. And just a couple of days ago, we received this poster from Holtville, CA, a fourth grader. And I would like to submit it for the record, and hand it to you, so you can see it. It says, "Know where the exit is." And the building that is depicted is a hotel labeled, "The DuPont Plaza Hotel."

So, fourth graders can in fact recognize and learn about fire safety. They can see the need for fire safety.

The national media campaign is best known, I guess, for its series of television spot announcements, which you referred to earlier. These TV spots have been credited up to date with saving 160 lives. The three most recent lives that were saved were at the DuPont Plaza Hotel fire. In fact, one of the women who saved her own life in that fire commented when she came out that all she could see was Dick VanDyke's face. And the behaviors that she learned from watching television in crawl low in smoke, in fact, allowed her to save her life.

So, I think that public education does work. It is an area that needs a lot more emphasis. I think there's no question about that. I think the difference, you mentioned earlier about Japan, the difference between Japan and the United States is not the law, it's the public attitude as Mr. Bragdon commented. It's the attitude about fire. Here fire is a tragedy; there it's a disaster that you create for your community, and it's just not acceptable behavior.

Well, with me at the witness table are Mr. Tom Klem, on my left, who is the director of Fire Investigations and Applied Research. Mr. Klem was the lead investigator of NFPA's team in San Juan, PR.

On my right is Mr. Jim Lathrop. He's a Senior Life Safety Code specialist for NFPA; and probably one of the preeminent authorities in the United States on fire and life safety in buildings. Jim would probably say he's not, but he is. Everybody wants his advice.

With regard to the budget deficit, I would like to just say one other thing. I think it's significant to acknowledge that NFPA's investigation, its report, which I would also like to submit for the record, was all done at no cost to the Government. It was funded entirely by NFPA, as we have done for many, many years. For a period of time we were a contractor for the Government, but before that and now we conduct fire investigations at our own expense.

So, without going into anymore detail, I would like to turn the microphone over to Mr. Klem and ask Tom to review with the committee some of the elements that have not been reviewed already by the National Bureau of Standards on the fire investigation.

And then when he's finished, Mr. Lathrop does not intend to testify; he's here to respond to your questions about fire and life safety in hotels and other buildings, and what can be done. And as was mentioned earlier, one of the only codes in the United States that does, in fact, relate to the retrofitting of sprinklers in existing buildings is the life safety code, and Jim is the expert. So, he will be able to deal with those issues for you.

So, let me turn the microphone over to Tom.

[The prepared statement of Mr. Gerard follows:]

NFPA
"Moving Mankind Toward Safety From Fire"

NATIONAL
FIRE PROTECTION
ASSOCIATION
INTERNATIONAL

Testimony of

John C. Gerard
Washington Representative
National Fire Protection Association

regarding

"Hotel Firesafety: What's Needed to Protect Our Citizens?"

before the

House Committee on Science, Space and Technology
Science, Research and Technology Subcommittee

March 5, 1987

EXECUTIVE OFFICE: BATTERYMARCH PARK, QUINCY, MASSACHUSETTS, U.S.A. 02269 • TELEPHONE (617) 770-3000 • TELEX 200250

The non-profit technical and educational organization. To promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the co-operation of its members and the public in establishing proper safeguards against loss of life and property by fire

The National Fire Protection Association (NFPA), organized in 1896, has as its mission the safeguarding of people and their environment from destructive fire, using scientific and engineering techniques as well as public education.

Membership in NFPA totals 38,000 individuals and 140 national trade and professional organizations. Although the vast majority of the members are residents of the United States, many are from Canada and more than 35 other nations around the globe. Members are drawn from the fire departments, health care facilities, business and industry, insurance, federal, state and local government. They are architects, engineers, building officials and many other professionals. Their one common denominator is an interest in fire and life safety.

Since NFPA was founded we have recorded data and information about how fires burn, how they can be prevented, and how they can be controlled in an effort to explain why fire continues to be such a major cause of death, injury and property loss in the U.S. Much of what we have learned has come from our internationally-recognized Fire Investigations Program. NFPA has been conducting fire investigations and engineering studies of major fires since the middle of the 1940's. Important lessons learned from these objective fire investigations provide guidance to both public and private sector firesafety initiatives through improved codes and standards and better public education.

NFPA originated the concept of using a multi-disciplinary investigation team; a process that is today universally recognized as the most effective way of developing a competent analysis of major fires. One of the earliest uses of this concept was in our joint investigation with the Bureau of Alcohol, Tobacco and Firearms at the MGM Grand Hotel Fire in 1980.

These investigations and studies, conducted by professionals with backgrounds in fire protection engineering, firesafety, code enforcement, human behavior and building code analysis, are an integral part of our mission. The resulting engineering and scientific data forms the nucleus of information used in the development of timely consensus codes and standards intended to minimize the effects of fire in all aspects of contemporary activity. NFPA standards and codes, which currently number about 250, are widely used as the basis of legislation and regulation at all levels of government, from local to national.

In addition to our technical mission, we are committed to an extensive and comprehensive program of public education entitled "Learn Not To Burn"®. The "Learn Not to Burn" program includes a national media campaign, a firesafety curriculum for school children, and an extensive outreach program supported by a regional field network of NFPA representatives. The work and training of this regional network is partially supported by the National Fire Academy.

The national media campaign is best known for its series of television public service announcements featuring actor Dick Van Dyke. These "spots," distributed to television stations throughout the United States, as well as in Canada and abroad, have been credited with saving at least 160 lives to date. The three most recent saves were at the Dupont Plaza Hotel fire in San Juan. One of the women whose life was saved commented, "All I could see was Dick Van Dyke's face".

With me at the witness table are Mr. Tom Klem, Director of Fire Investigations and Applied Research, and Mr. Jim Lathrop, Chief Life Safety Code Specialist. They are here today to share with the Committee their preliminary findings and most importantly, the meaning of the NFPA fire report. (Because this fire is the subject of an on-going criminal investigation in Puerto Rico some information may be unavailable to the Committee at this time.)

NFPA
"Moving Mankind Toward Safety From Fire"

NATIONAL
FIRE PROTECTION
ASSOCIATION
INTERNATIONAL

## Interim Report and Findings
## Dupont Plaza Hotel and Casino
## 96 Fatalities
## December 31, 1986

On December 31, 1986, a mid-afternoon fire at the Dupont Plaza Hotel and Casino in San Juan, Puerto Rico resulted in 96 fatalities and over 140 injuries. An investigation was conducted by the National Fire Protection Association to document and analyze significant factors that resulted in the rapid fire development and spread that led to the large loss of life. Within 24 hours NFPA dispatched an investigation team of five specialists to conduct the study, and as in past major fires, worked in cooperation with the Bureau of Alcohol, Tobacco and Firearms (ATF) and local authorities. ATF dispatched its national response team at the request of the Puerto Rican authorities to help determine the cause and origin of the fire. ATF is the federal agency responsible for investigating major arson and explosion crimes. NFPA and ATF are continuing cooperative efforts on this incident. A fully detailed and final NFPA report will be available in June.

The fire occurred in a non-sprinklered, 20-story hotel complex that contained a first-floor ballroom, a second-floor (main entrance level) casino, mercantile shops, restaurants and function rooms in addition to the 17 guest room floors. Construction included unprotected noncombustible and some combustible construction in the ballroom area; and fire-resistive construction in the casino, lobby area and the high-rise tower. There were no fire detection systems and there was a local-only, manual fire evacuation alarm system installed in the high-rise tower which was apparently not working at the time of the fire. There was also a standpipe and hose system in the

EXECUTIVE OFFICE: BATTERYMARCH PARK, QUINCY, MASSACHUSETTS, U. S. A. 02269 • TELEPHONE (617) 770-3000 • TELEX 200250

The non-profit technical and educational organization To promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the co-operation of its members and the public in establishing proper safeguards against loss of life and property by fire.

tower. There was no evidence of a fire evacuation plan for the hotel nor was any training of employees to complement such a plan apparent.

## BACKGROUND

Constructed in the early 1960's and first occupied in the fall of 1963, the Dupont Plaza Hotel and Casino was located on Ashford Avenue in San Juan's Condado Beach section, a tourist area of the island. The oceanfront building was positioned approximately 200 feet off Ashford Avenue, connected by a circular driveway that gave access to the hotel's open-air, main entrance area on the casino and lobby level. This level contained the hotel registration and lobby area, a discotheque, function rooms, mercantile shops, restaurants and the casino.

The U-shaped casino was positioned north of the building core which housed the service equipment such as the elevator equipment rooms for the high rise. The casino had two exits that discharged into the hotel lobby (see attached diagram). The main entrance/exit was at the east corridor of the casino and consisted of two 36-inch glass doors set in a metal frame. The doors were designed to open in either direction. The casino's west exit was a 36-inch wooden door, set in a wood frame and opened into the casino. When closed, this door required two simultaneous actions to unlatch and open it.

An open foyer with stairway connected the casino level to the ballroom level below. In addition to the large ballroom located on the northeast portion of the building, this level contained the kitchen and support facilities, some of the hotel staff offices, and the receiving dock. Direct access to the building's swimming pool, parking area and access to the beach could be gained from the ballroom level.

The building also contained a basement level which occupied approximately two-thirds of the gross floor area of the casino and ballroom levels. The basement contained an employee cafeteria, maintenance shop, mechanical equipment room, laundry and electrical transformer room. A partial automatic sprinkler system supplied by the building's domestic water protected the laundry area and the trash and laundry chutes. Because of its very limited coverage and its location remote from the fire area, the partial system was not a factor in this incident. Access to the basement was gained by way of the building's interior stairways or from an exterior stairway located on the east side of the building near the receiving dock.

In addition to the main entrance and the entrance to the basement, access to the building could also be gained by an outside spiral stairway located on the west side of the building (pool side), connecting the swimming pool area to the casino/lobby level. This entrance was also an open-air passageway. From the ocean side (north) one could gain access to the building through two exterior doors placed in a glass partition between the exterior and the ballroom foyer area. Wooden louvers above the doors allowed outside air to infiltrate the foyer at these locations.

The high-rise tower was constructed above the area enclosed by the main lobby and casino. The high-rise tower was of fire resistive construction and used a center core construction method to enclose service and passenger elevators, a utility and pipe chase, the building's two interior stairways, and heating, ventilation and air conditioning (HVAC) duct work which supplied conditioned air to guest room floors.

There was approximately a 20-foot distance from the poured concrete floor of the lobby and casino level to the floor above. A metal lath and plaster suspended ceiling system was provided in the lobby and the casino. The distance from the floor to the finished ceiling was approximately 15 feet. The void created a large plenum area over the lobby and casino areas.

The hotel portion of the complex consisted of 17 guest room floors. The floors were numbered 3 through 20; there was no designated 13th floor. A restaurant with kitchen facilities was located on the 21st floor. The remaining upper levels of the building contained HVAC (for floors 11 through 21) and elevator equipment rooms, maintenance and other support service areas. The building's two interior stairways and passenger and service elevators served all occupied levels of the building. One of the stairways provided access to the equipment room levels and the roof by way of a hatch.

The building's high-rise tower was of fire-resistive construction having poured concrete columns and floor assemblies. The center core was enclosed with two-hour fire resistive materials. In general, each guest room floor contained 25 guest rooms positioned along the outer perimeter of the tower. Access to the guest rooms was gained by way of a corridor between the core and guest rooms. Doors to guest rooms were not self-closing nor did the rooms contain individual smoke detectors. Individual HVAC units provided conditioned air to guest rooms. The units were located in a plenum area above each bathroom. Make-up air for guest rooms was taken from the corridors and then conditioned and distributed into guest rooms.

Service and passenger elevators served all guest room floors. The four passenger elevators opened directly onto the exit access corridor. The two service elevators opened onto a service room. Also included in this room was a maid's service area, and trash (abandoned) and laundry chutes. Louvered doors provided access from the service room to the corridor.

Access to the scissor stairways was provided on the east and west corridors through 36-inch self-closing fire doors. Illuminated exit signs were provided near stairway exits. Manual pull stations and alarm bells were located in the corridor in close proximity to the stairways. Exits for the high-rise tower, which included exits for the roof-top restaurant, were designed to discharge into the hotel lobby.

## THE INCIDENT

At approximately 3:22 P.M., the fire was discovered by an employee in the first-floor, unoccupied south ballroom at the east end of the complex. Agents from ATF and local authorities determined that the fire was deliberately set in a large stack of recently delivered guest room furniture temporarily stored in the ballroom. The furniture was still in packing materials and occupied an area of the south ballroom determined to be 18 feet by 31 feet and stacked to a height of six feet.

Once ignited, the fire developed quickly, involving the stored materials and the combustible interior of the south ballroom including carpeted walls, stacked chairs and a combustible, removable partition separating the south ballroom (room of fire origin) from the adjoining north ballroom.

As the south ballroom was approaching full involvement, the fire penetrated the combustible partition, spreading products of combustion to the adjoining north ballroom and to a balcony area directly above. Room flashover conditions were reached causing the glass wall of the south ballroom to fail, spreading products of combustion to a foyer connecting the ballroom level to the casino level above.

Some occupants on the ballroom and casino levels became aware of the rapidly spreading fire and began to move toward exits. The majority of the occupants in the casino moved toward the west exit which led into the hotel lobby and out onto the spiral exterior stairway which led to grade. Not all of the casino level occupants were able to safely reach the west exit before the flame front traversed the lobby and vented out the opening to the spiral stairway. When this occurred, the exit path for the remaining occupants inside the casino was blocked. At some point the exit door on the west side of the casino was closed. Some of the occupants broke the exterior glass walls of the casino and jumped approximately 20-feet to the ground. However, during this process, a fire front moved into the casino as windows adjoining the foyer failed.

Once the fire had reached the casino level, smoke spread to the high-rise tower by several means, including service and passenger elevators, the hotel's HVAC system, toilet exhausts for guest rooms, the exterior of the building, and through stairways connecting the casino level to the high-rise. Occupants of the high-rise became aware of the fire and many moved to the roof of the building and waited for removal by helicopter while others waited to be rescued on guest room balconies.

The fire department was notified at approximately 3:40 P.M. Because of the severity and magnitude of the fire, and due to the complexity of the rescue problems that confronted fire fighters on their arrival at about 3:45, the fire burned for nearly five hours until finally extinguished. After extinguishment, fire fighters began to locate fatalities, mainly clustered near the west exit of the casino.

## PEOPLE MOVEMENT IN THE CASINO

Based on eyewitness accounts, the occupants of the casino first became aware of something unusual in the building when what was described as an "explosion"* was heard. One casino patron observed "white smoke" on the exterior of the building in the area of the ballroom. The observation was through one of the plate glass windows along the perimeter of the casino. Gambling activities apparently continued and there were no reports of people leaving the casino at this time. Shortly after the "explosion," several people came into the casino and alerted the patrons of the fire in the building. Also several occupants observed smoke in the area of the ballroom. Subsequently, all gambling was stopped and occupants began moving toward the exits. The estimated 300 occupants apparently divided into two groups while moving toward the exits. One of the occupants, moving toward the west exit, saw "smoke and flame" coming from the area of the exit door. This person then began to move toward the other exit but was met by the second group returning from the main exit which was apparently blocked by smoke.

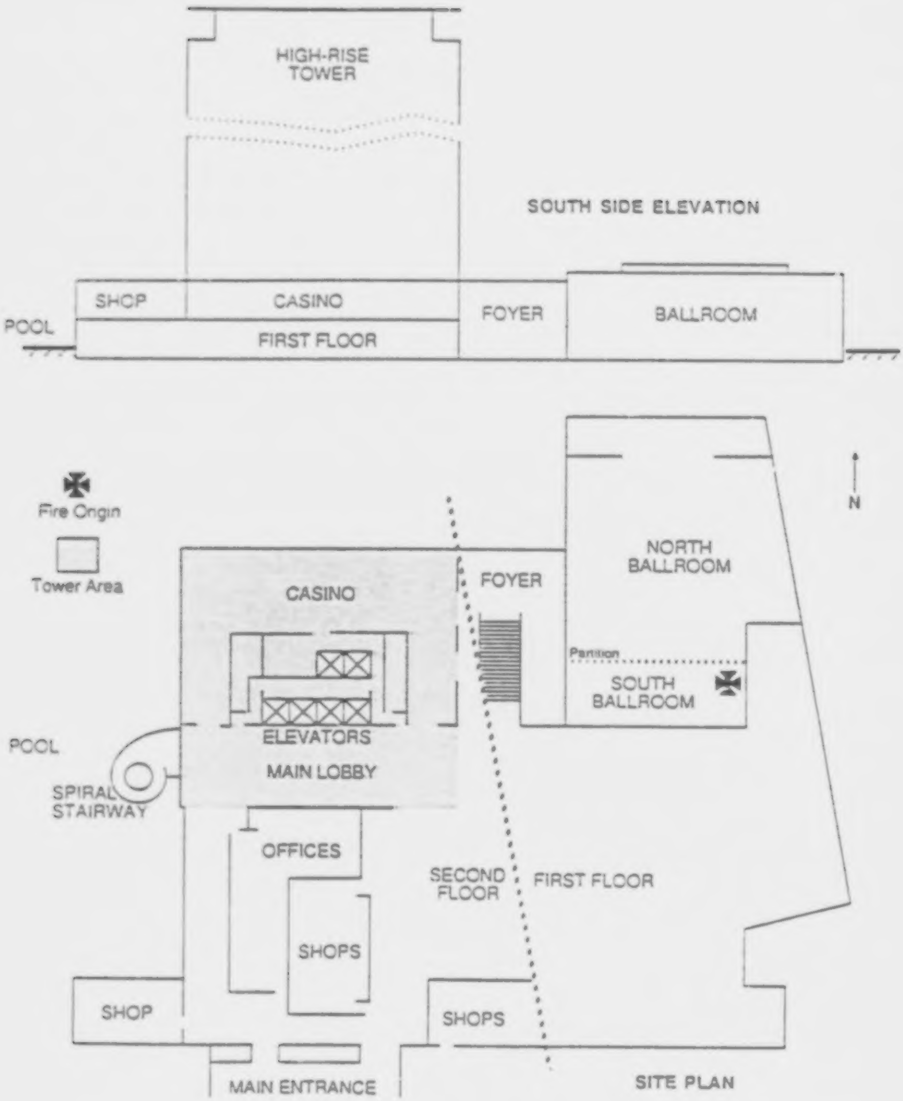
---

*Investigators determined that these sounds were associated with the rapid growth and spread of the fire and the breakage of glass partitions as the fire spread through the building.

Smoke was spreading through the casino and coming from "air conditioning ducts." The groups merged in the west side of the casino in their attempt to exit the building and apparently, the west exit door became closed at about this time. A secondary "explosion" was then heard in the northwest corner of the casino above the occupant's heads. One occupant saw the ceiling "turning black." followed shortly by a ceiling level flame front moving toward him.

As conditions in the casino deteriorated, several glass panels were broken on the pool and ocean sides and 8-10 occupants were able to escape before room flashover conditions were reached. After jumping, one survivor saw fire venting from the casino windows. The screams that he had heard before jumping soon stopped.

Eighty-six of the 96 fatalities were located in the west portion of the casino. Five fatalities were located in the lobby area, three were found in a passenger elevator stopped between the basement and first floor level, one fatality was found in a guest room on the west side of the fourth floor, and one victim was found seated at the poolside bar just below the casino.


HIGH-RISE TOWER
SOUTH SIDE ELEVATION
SHOP
CASINO
FOYER
BALLROOM
POOL
FIRST FLOOR
Fire Origin
Tower Area
N
NORTH BALLROOM
FOYER
CASINO
Partition
SOUTH BALLROOM
ELEVATORS
MAIN LOBBY
POOL
SPIRAL STAIRWAY
OFFICES
SECOND FLOOR
FIRST FLOOR
SHOPS
SHOP
SHOPS
MAIN ENTRANCE
SITE PLAN

DUPONT PLAZA HOTEL

Not to Scale

Mr. KLEM. Thank you, Mr. Chairman and members of the committee.

As we all know, on December 31, 1986 a mid-afternoon fire at the DuPont Plaza and Hotel in San Juan, PR resulted in 96 fatalities and over 140 injuries.

An investigation was conducted by the National Fire Protection Association, and the purpose was to document and analyze the significant factors that resulted in the rapid fire development and spread that led to the large loss of life. Within 24 hours of the incident the NFPA investigative team of five specialists began to arrive on the scene in San Juan to begin to conduct the study.

As in past, major fires, we worked in cooperation with the Bureau of Alcohol, Tobacco and Firearms and local authorities. NFPA and ATF are continuing this cooperative effort on this incident. A full detailed and final report will be submitted and available in June of this year.

The fire occurred at a nonsprinklered, as has been brought out earlier, 20-story hotel complex that contained a first floor ballroom, a second-floor casino, mercantile shops, restaurants, functions-room, in addition to the 17 guest room floors.

Construction included unprotected noncombustible materials, some combustible construction in the ballroom area, and fire-resistive construction in the casino, lobby area, and the high-rise tower.

There were no fire detection systems, and there was a local only, manual fire evacuation alarm system installed in the high-rise tower, which apparently was not working at the time of the fire.

There was also a standpipe and hose system in the tower. There was no evidence—we found no evidence of a fire evacuation for the hotel, nor was there any training of employees to complement such a plan that was apparent to us.

The DuPont Plaza was constructed in the early 1960's. And in the fall of 1963, it opened for business. The hotel was located in the Condado Beach section of San Juan. There's a very beautiful oceanfront building that was positioned approximately a hundred—or excuse me, 200 feet off Ashford Avenue connected by a circular driveway that gave access to the hotels open-air main entrance. This level contained the hotel registration and lobby, a discotheque, function rooms, mercantile shops and a restaurant.

And directing your attention to the board there, you can see the general layout of the casino level, and its relationship to the upper ballroom area.

The U shaped casino was located in the western portion of the building, and its relationship to the room and area of origin is apparent. A spiral staircase gave access from the outside pool side to the casino and main lobby, registration area, and the open-air atmosphere was present at this exit, the main entrance, and your circular driveway that you see here.

The casino had two main exits that discharged into the hotel lobby. The main entrance at the east end of the corridor of the casino consisted of two, 36-inch glass doors. The doors were designated to open in either direction. The casino's west exit was a 36-inch wooden door, set in a wood frame and opened into the casino. When the door was closed, this door required two simultaneous actions to open and unlatch.

An open-air foyer with a stairwell connected the casino level to the ballroom level, the level of fire origin.

Concerning the high-rise tower, it was constructed above the enclosed area of the main lobby and casino. In areas that we have left the structural columns to represent the area approximately 110 feet square that the high-rise tower rose from that particular location.

It had a construction type that we refer to as a center core construction type to be integrated with the fire-resistive general construction. In this core were service and passenger elevators, utility and pipe chase, and the building's two interior stairwells in addition to the heating, ventilation, and air conditioning system, four floors, three through 10.

In general, each guest floor contained 25 guest rooms that were positioned along the outer parameter of the hotel. Access to the guest room was gained by the way of a corridor between the core and the guest rooms. The doors were not self-closing. And the rooms did not contain individual smoke detectors. Individual heating ventilation and air conditioning units were provided and located in bathrooms in each of the guest rooms.

Make-up air for the guest rooms was taken from the corridors conditioned and distributed into the guest rooms. Exits for the high-rise tower, which also includes the exits for the rooftop restaurant were designed to discharge into the hotel lobby.

The sequence of the fire was very well depicted by Dr. Snell, so I'll move quickly through that.

We, in our testimony that we have submitted, align very well with what has been presented. The fire occurred at about 3:22 p.m. And as we presented earlier, it involved stored and stacked furniture materials that were positioned in the south ballroom.

Mr. **Walgren**. Let me say that we have another vote there that we can go a little bit more, but I'd like to get through your testimony. And so, if you would really focus on those points that led to the deaths themselves, that will help us get through the panel.

Mr. **Klem**. All right, very good.

The NFPA analysis of the data points to major contributing factors to the loss of life in the DuPont Plaza Hotel and Casino as follows:

One, was the lack of automatic sprinklers in the south ballroom. Once ignited the amount and the arrangement combustibility of these stored materials in the south ballroom, resulted in a rapidly developing fire. The fire was discovered in its advanced stages, and initial attempts to control the fire by occupants were not successful.

Automatic sprinklers properly installed and maintained could have controlled the fire in this development stage well before flashover—our computer analysis corroborates that finding.

As a result, the tragedy would have been averted, had the sprinklers been installed.

The study of similar fires show that multiple deaths can and do occur throughout the building, after flashover conditions are reached in the room of origin. This happens when heat, smoke, and toxic acids spread to remote areas of the building by means of vertical and horizontal penetrations, because flashover can be prevented by sprinklers, then the life safety aspects are achieved. The record for sprinklers, based on our analysis, indicates that the performance is excellent.

NFPA has no record of a multiple death fire in a completely sprinklered building of this occupancy type, where the system has been properly maintained.

The second significant factor was a rapid growth and spread of the fire. The agents from ATF and local Puerto Rican authorities determined that the fire was deliberately set among the stored materials. The open-flame ignition of stored materials in the south ballroom, its geometric arrangement, and the arrangement of the room itself, the abundance supply of air, the heat release characteristics of the stored materials resulted in an extremely rapid buildup of the fire, as was well depicted.

The removal combustible partitions separating the north and the south ballroom, the interior finish materials on the walls of the south ballroom contributed to the major and rapid flames spread from the room of origin.

Third, the lack of fire detection systems and inadequate exits in the casino. The casino was located in a semi-isolated area of the hotel. There were no automatic detection systems as well, to alert occupants of the fire. The occupants of the casino were not alerted to the fire until its advanced stages. After flashover in the south ballroom, only a short interval of time existed before untenable conditions were reached in the casino.

The casino was designed to have patrons exit through the hotel lobby, which discharged to the exterior of the building. The arrangement of the west exit for the casino was such that when closed, the door required two simultaneous actions. Each exit for the casino should have been capable of accommodating one half of the total occupant load. The west door could not accommodate the load for the casino.

The lack of early awareness of the fire by the occupants, combined with inadequate exits resulted in insufficient time for evacuation.

Fourthly, a vertical opening between the ballroom and the casino level created, allowed smoke and fire to move to the casino level, and then into the casino itself. As a result, smoke and fire spread to the lobby, effectively blocking the exit pass for the casino and high-rise occupants. Within minutes the glass partitions failed and products of combustion swept through the casino, trapping those occupants who had not escaped.

Fifth, smoke moving into the high-rise tower by ways of vertical penetrations, HVAC systems, the exterior of the building, passenger and service elevators, utility penetrations, and even one of the stairwells.

As tragic as the fire at the Dupont Plaza was, the death toll could have been worse had it not been for guest room exterior balconies. Smoke spread into the high-rise, was severe enough that additional fatalities could have occurred had it not been for this factor.

The findings from this investigation powerfully demonstrate an all-too-familiar life safety lesson. There is always potential for high-life loss in any setting where people gather, especially when conditions exist for rapid-fire growth and room flashover. These conditions can occur whenever there is a concentration of combustible contents or when there is highly-combustible interior finish, or both.

In this situation, there were no sprinklers to prevent flashover; there were no detection systems to warn occupants. Many occupants of the casino were unable to escape because of exit deficiencies. Unprotected vertical and horizontal openings allowed heat, smoke, and toxic gases to spread through the building.

Once again, history repeats itself. And our investigation reveals many of the same conditions which almost all devastating fires share. The fact is that fire safety technology is and has been available to prevent this tragedy. Fire safety codes and standards are available for use by architects, engineers, owners, operators, and other persons responsible for fire safety to the public. These fire safety codes and standards provide a means for continuous review and updating of the quality of fire safety in hotels and similar occupancies.

Had NFPA's Life Safety Code, which contains provisions requiring the upgrading of existing buildings been used voluntarily by interested persons, or had it been adopted and enforced by public authorities, a tragedy of this magnitude would never have occurred.

Thank you, Mr. Chairman.

Mr. WALGREN. Thank you.

We have a vote on over there, and Mr. Boehlert will be right back, and I will go over now, but he will be able to start with you when he gets back, so let's suspend for what will be about five minutes, and then we ought to resume directly because we are longer getting through the panels than we would like to be.

[Recess.]

Mr. BOEHLERT [presiding]. We're going to resume and I don't want you to think that there's a coup, the Republicans haven't taken over the House, but the chairman is giving me the authority to proceed. And as I understand it, Mr. Miller, you are next, unless—anything further to say, Mr. Gerard? Mr. Klem? Mr. Lathrop? All right. Mr. Miller, would you proceed? The Chairman will be back momentarily.

Mr. MILLER. I'm Robert Miller, representing the Western Fire Chiefs Association, which is a division of the International Fire Chiefs, and I appreciate the opportunity to appear before the committee. I represent the fire chiefs in the western division, as well as the 23 States that use the Uniform Fire Code, one of the model fire codes in the country. We have heard some key factors here today, and not to be lengthy, but I'd like to recap a few things.

We heard the statement that 95 percent of the hotels in this country are not sprinklered. We also heard testimony that there has never been a multiple life loss fire in a completely sprinklered building of residential nature.

We know what the answer is, and that's sprinklering buildings. All of these things that we looked at, and we've heard today, public education, there are sociological factors, obviously that—attitudes that must be changed. There's new standards, there's new technology that has to be developed, but the one thing that we know as

Fire Chiefs that prevents people from dying in buildings, is the installation of sprinklers.

In my report, I have given a very brief history of the sprinkler system, which I don't intend to repeat, but sprinklers have been around 100 years. One of the reasons why the model codes have not incorporated the requirements for sprinklers for residential type occupancies, for most of those 100 years is that they were viewed as protection for buildings and combustibles within those buildings, for insurance purposes.

Since the America Burning report, there's been a tremendous amount of new technology and research. We have developed new quick acting sprinkler heads and new plastic pipe systems that can reduce installation costs and reduce costs in retrofitted type applications. The old sprinkler systems were not necessarily designed for life safety, but the new systems have that capability. We're talking about heads that can go off within seconds. While people are comfortably seated in a room, they can extinguish a fire. So the technology is here.

We have to distinguish very clearly, when we talk about the model codes between new construction and retrofitting existing buildings. They are totally separate issues. The model codes, at this point in time, have not caught up to technology. This is a normal state of affairs, because codes are more conservative, and they wait until systems, procedures and technology prove certain facts before they change. They naturally are more conservative and are the last things to change in many cases.

So it's time for the model codes to move on. We have seen that process working through the four major model code groups in this country, through code coordination and the requiring more of sprinkler systems in this building—in new buildings, and in existing buildings.

The Uniform Fire Code that is written by the Western Fire Chiefs, is one of the model fire prevention codes, and is the only code in America written by fire chiefs exclusively. In that code, we have optional requirements for existing buildings. Since—existing buildings are special subjects unto themselves, and because it's a local issue, the provisions in the Uniform Fire Code are set aside in appendices for the existing buildings.

When agencies adopt our appendix for existing buildings, and it becomes a mandatory requirement for what you're going to do for minimum standards in existing buildings. There are no options. Sprinkler systems in high rise—existing high rise buildings are required specifically in all assembly rooms for more than 100, all corridors, exitways, stairways, and in all rooms adjoining corridors. There would also have to be at least one head inside the door of each room. There are no non-sprinklered options if you adopt that appendix in the Uniform Fire Code, which is an interesting point.

But in the case of—the DuPont Plaza, under our existing code provisions, the north-south ballroom, the foyer, the main lobby, the casino, the restaurants, the disco, and the exitways, the corridors on the upper floors, and the room inside each corridor would have been required to be sprinklered. I believe, as the witnesses have stated in the testimony which has transpired, sprinkler systems would have made a tremendous difference in this fire.

When it comes to existing buildings, as an old fire inspector myself, this is a—if new buildings are a difficult problem, this has to be at least twice as hard, the retrofitting of existing buildings. There's three reasons—three opposing things that happen. One is cost, and next you have special interests, and this all results in the third factor, politics. You're right that code enforcement, fire safety, is primarily on the shoulders of the local government to adopt minimum standards. Many States, and State fire marshals have taken on at a State level the responsibility to provide minimum life safety, but in large, it's a local responsibility, and it is very difficult to go out and sell, and to impose cost, additional cost, on existing buildings.

The model building codes operate under the principle, that if a building is built, and it complies with the code at the time it's constructed, that building, as long as it doesn't change, can continue to exist. That is the prevailing philosophy, and it is sound in the sense that every time a new code is published, or adopted, every building in town could be considered in noncompliance.

But the part that's missing is, there has to be a minimum standard somewhere for existing buildings, so that regardless of what code they were built under, if it is a proven fire safety hazard, there can be something done to correct it. When you consider all the options in hotels, and you consider bringing corridors up to code building fire walls, installing various types of systems, in many cases, it's much more economical to install a sprinkler system than do many other things with the construction of a building.

So considering all the sociological factors, education, the cost involved, and the new technology, many fire chiefs, building officials, and code experts feel that retroactively sprinklering hotels is a definite way to eliminate fires like the DuPont Plaza. This takes retroactive enforcement of codes, which is not popular, it has to be sold to your local communities, and it takes a fire chief that has an understanding of fire safety and is willing to take that leadership role in his community.

Thank you.

[The prepared statement of Mr. Miller follows:]

**Western Fire Chiefs Association, Inc.**
*Organized September 30, 1891*
5360 SO. WORKMAN MILL ROAD • WHITTIER, CALIFORNIA 90601 • (213) 699-0541

ROBERT V. MILLER
Fire Code Coordinator

Committee on Science, Space and Technology
United States House of Representatives

Science Research and Technology Subcommittee

Dear Chairman Doug Walgren and Members:

From the fire chief's prespective, there are two major reasons why hotels and apartment buildings in this country are particularly vulnerable to devastating fires, such as the Dupont Plaza Hotel fire of December 31, 1986. First is the lack of quality maintenance inspections, and the second is the need to ensure that existing buildings meet a minimum standard of fire and life safety. Lets discuss these issues separately.

I. Maintenance

Investigations have shown in a large number of recent hotel fires, that the buildings were constructed in areas that had good building and fire codes already in place. Therefore, it must be assumed that the buildings were required to meet those codes at the time of construction.

Unfortunately, in many areas after the building has been constructed regular follow-up and maintenance inspections are few and incomplete. Over the years that follow occupants fill the buildings with combustible materials, furnishings

*Division of International Association of Fire Chiefs*

and decorative material. Exitways are illegally altered and blocked. Illegal locking devices are placed on exit doors in the name of security. Often repairmen and workers knock holes in fire walls and corridor walls to install piping, electrical lines, or heating and ventilation systems. Slowly the fire detection systems, fire alarm systems, standpipe systems and sprinkler systems (if installed) fall into disrepair or are intentionally turned off because they are considered a nuisance. These circumstances present a "design for disaster" that is all too common in America.

The solution to this problem is to have an active comprehensive fire inspection program in every community. Over the past twenty years, more and more fire departments are establishing serious Fire Company Inspection Programs. These programs are ideal in that they provide Fire Departments with the necessary staff to inspect all buildings on a regular basis. In the past, fire departments could not afford the necessary inspection staff to carry on a job of this magnitude.

## II. Minimum Standards

The subject of minimum fire safety standards for existing buildings is a much more complex issue. The "Model Buiding Codes" operate under the premise that a building that complies with the code at the time of construction has the legal right to operate as long the use of the building does not change and modifications are not made. This is a sound concept and is generally accepted throughout the country. Otherwise, everytime a new edition of the code is adopted, buildings built under previous editions could potentially be considered in violation of the code.

However, it is recognized that in many areas there are buildings that were constructed prior to the adoption of local or state codes. The model building codes have only been in existence for about 40 - 70 years and there are still many rural areas that, even today, have not adopted codes. Also, fire experience has shown over the years that some conditions permitted in earlier building codes present a serious fire hazard.

For these reasons, the Uniform Fire Code states in the Administrative provisions that "the provisions of the Fire Code shall apply to existing conditions as well as to conditions arising after the adoption of the code, except that conditions legally in existence at the adoption of this code and not in strict compliance there with shall be permitted to continue only if, in the opinion of the (fire) chief, they do not constitute a distinct hazard to life or property," (U.F.C. Section No. 1.03.b).

In the case of hotel and apartment buildings, some of the existing conditions that have proven to be extremely hazardous to Fire and Life Safety are unprotected vertical shafts, (examples: elevators shafts, dumbwaiter shafts, pipe chases, heating and ventilating shafts, and open stairways), in adequate numbers of exits, and unprotected exit corridors.

It has long been recognized that the vast majority of United States fire deaths (approximately 75-80 percent) occur in dwelling type buildings where people live and sleep. For this reason model codes have required smoke detectors for sleeping areas in new buildings for about ten years. Smoke detectors are currently considered one of the major tools in providing sleeping occupants with early warning of fire. The price of smoke detectors has fallen from over $100 each to less than $10.00 during this time. The reason for the drop in price is due to the mass production of the units. There is no question many lives have been saved because of the smoke detectors.

## III. Sprinkler Systems

Fire sprinkler systems play a major role in minimum standards for existing buildings. Because of their importance, this subject is being addressed as a separate issue.

Many fire chiefs, building officials, fire protection engineers and code specialists are now convinced that the time for residential sprinklers is at hand. The sprinkiers record is unsurpassed and they are the most effective fire protection tool ever developed. The sprinkler system has no equivalent! Sprinklers are, in laymens terms, "a built in, instantly available, Fire Department."

The obvious question is then why don't we have them in all buildings? The answer is partially found in the history of the sprinkler system.

Briefly, sprinklers were developed in the late 1800's as a protection for buildings and their contents for insurance purposes. Over the decades that followed, they were used strictly for that purpose. Fire and building codes required sprinklers to protect hazardous processes and large amounts of combustible materials. They were never considered as a direct life safety tool because the temperatures required to activate sprinkler heads (minimum 165$^{\circ}$ F) were so high that the smoke and heat would probably kill people in the fire area prior to activation. However, it was recognized that indirectly sprinklers did save lives because if they controlled the size and spread of fire that people in other areas would have additional time to evacuate the building.

In the past fifteen years, however, a lot of rethinking and new technology has revolutionized the whole concept of sprinkler systems. New residential type sprinkler heads have been developed that will react to fire in a matter of seconds. Recent tests have shown sprinklers activating and extinguishing fires while people were comfortably seated in the room. Also, new types of plastic piping has been developed which provides for lower cost in many applications and affords easy installation.

These new advances along with the growing realization that fire continues to take its toll in nonsprinklered buildings has convinced many observers that the new generation of sprinkler systems are a big part of the answer for buildings where people are present.

For the reasons stated above, the Uniform Fire Code provides two Appendices Articles for existing buildings. These sections, if adopted, establish minimum requirements for all existing buildings. The provisions specifically set for requirements are as following:

1. Minimum number of exits.
2. Minimum corridor protection.
3. Fire escape maintenance.
4. Enclosure of vertical shafts.
5. Sprinkler systems for basements and stories of buildings without adequate fire access openings.
6. Standpipes.
7. Smoke detectors in hotels and apartments.
8. Fire resistive separation walls between hazardous uses.

For existing high-rise buildings the separate Appendices establishes provisions for the following:

1. Automatic sprinklers in lobbies, exit corridors, stairwells, kitchens assembly areas, and heads in rooms adjoining corridors.
2. Minimum number of exits.

3. Corridor protection.
4. Elevator lobby separation.
5. Fire alarm system.
6. Exitway illumination.
7. Emergency plans.
8. Fire drills.

Appendices in the code must be specifically adopted to be a part of the code. Many agencies have adopted these provisions.

## IV. Conclusion

The primary reasons for not retrofitting existing buildings with minimum Fire and Life Safety features are cost, special interest, and politics. Enforcement agencies that set out to establish and enforce minimum requirements for existing buildings must gain the support of their legislative bodies. This is often not an easy task; however, more and more local and state agencies are adopting laws requiring sprinklers, smoke detectors, and minimum standards for existing buildings.

**Western Fire Chiefs Association, Inc.**
*Organized September 30, 1891*
5360 SO. WORKMAN MILL ROAD • WHITTIER, CALIFORNIA 90601 • (213) 699-0541

ROBERT V. MILLER
Fire Code Coordinator

Uniform Fire Code

The Uniform Fire Code is one of the "family" of model codes known as the "Uniform Codes". The Uniform Codes include a Building Code, Fire Code, Mechanical Code, Plumbing Code and several other related codes. The Uniform Codes are published by the International Conference of Building Officials, one of the three model building code organizations. The codes are used extensively in some 23 states, several federal agencies and a number of foreign countries.

The Uniform Fire Code was developed by Fire Chiefs in the West in the mid 1950's. In 1970, an agreement was made between the Western Fire Chiefs Association (a division of the International Fire Chiefs) and the International Conference of Building Officials to jointly publish the code as a companion document to the Uniform Building Code.

The Uniform Fire Code is the only Model Fire Code in the nation which is currently developed exclusively by the fire service.

*Division of International Association of Fire Chiefs*

## ADDENDUM

### SOME OF THE MAJOR U.S. HOTEL FIRES IN RECENT YEARS.

Category I - Hotels not equipped with complete sprinkler systems.

| | | |
|---|---|---|
| Sept. 7, 1943 | Gulf Hotel, Houston, Texas | 55 dead |
| June 5, 1946 | The La Salle, Chicago, Illinois | 61 dead |
| Dec. 7, 1946 | The Winecoff Hotel, Atlanta, Georgia | 119 dead |
| Dec. 20, 1970 | Pioneer International, Tucson, Arizona | 28 dead |
| Nov. 21, 1980 | MGM Grand, Las Vegas, Nevada | 84 dead |
| Dec. 4, 1980 | Stouffer's Westchester Inn, Harrison New York | 26 dead |
| Feb. 10, 1981 | Las Vegas Hilton, Las Vegas, Nevada | 8 dead |
| Mar. 6, 1982 | Westchase Hilton, Houston, Texas | 12 dead |
| April 30, 1982 | Pinter Hotel, Hoboken, New Jersey | 13 dead |
| Sept. 4, 1982 | Dorothy Mae Apartment Hotel, Los Angeles, California | 24 dead |
| June 14, 1983 | Ramada Inn Central Hotel, Fort Worth, Texas | 5 dead |
| Dec. 31, 1986 | Dupont Plaza Hotel, San Juan, Puerto Rico | 96 dead |

Category II - Hotel totally protected by approved automatic sprinkler systems.

No multiple deaths have occurred in these occupancies.

# BIOGRAPHICAL SKETCH

**Robert Viron Miller**

| | | |
|---|---|---|
| Age: 43 | Married | Three Children |

Military Status: Veteran - U.S. Navy 1962-1966.
Awards: Vietnam Service, Good Conduct, National Defense.

## Colleges Attended:

Grossmont College, Miramar College,
San Diego State University.
Major: Fire Science.

## Experience and Qualifications:

**1968-1983:** City of San Diego Fire Department.

Attained the rank of Battalion Chief and Assistant Fire Marshal.

Twelve years full time fire and building code enforcement.

Chairman of the California State Fire Chiefs' Fire Code Committee 1977-1980.

President of the California State Fire Chiefs' Fire Prevention Officers Section - 1983.

California state teaching credential in Fire Science.

University of California at Los Angeles - Fire Protection Engineer Certificate Program - Instructor.

National Fire Academy - Adjunct Instructor - Fire Prevention.

## 1983 - Present:

Uniform Fire Code Coordinator for the Uniform Fire Code, published jointly by the Western Fire Chiefs Association, Inc., and the International Conference of Building Officials.

## Responsibilities Include:

Formal Code Interpretations.
Technical staff support for the W.F.C.A. Uniform Fire Code Committee.
Conduct Fire Code Seminars.

Mr. **Boehlert**. Thank you very much. We'll start with questions. We've got a problem. There's another vote in progress, so we're well organized in the House of Representatives—organized confusion. I'll start the questions, and as soon one of my colleagues comes back I'll depart. If they don't come back by the time the second bells ring, I'll have to depart and declare a brief recess. But I like the power of the gavel right here, and I don't get it very often.

Tell me, we need some minimum standards, you say, Mr. Miller. Should they be Federai standards? Do we need a National Fire Code?

Mr. **Miller**. There needs to be minimum standards established in hotel safety in every community, and obviously, this has not been done. The model codes do not provide a minimum standard for existing buildings unless they are specifically adopted. Many communities are already establishing—we have many communities who are taking the leadership. There's communities that require sprinkler systems in every dwelling.

Mr. **Boehlert**. But many communities do nothing.

Mr. **Miller**. Yes, many communities do nothing.

Mr. **Boehlert**. And they're the problem.

Mr. **Miller**. So short of a state law, or some sort of higher power requiring such a minimum standard, it appears that locally we're not going to get the job done in all communities.

Mr. **Boehlert**. Many States are not addressing the problem, so I guess my basic question is, should we be addressing the problem from a Federal level, for a minimum standard? I mean, we've heard this eloquent testimony, all this morning, that we've had the technology for decades to prevent a tragedy of this magnitude, we just haven't employed that technology. Is it time that we considered, from Washington, a National Fire Code, for some minimum standards that you would find acceptable, that most prudent people would find acceptable?

Mr. **Miller**. I can't answer the question is it time for a National Fire Code, but we do need some minimum standards for certain types of life safety allocations here.

Mr. **Boehlert**. That's what I'm trying to get at. At what level do we need these minimum standards? Mr. Gerard? Mr. Klem?

Mr. **Klem**. Mr. Chairman, I'd like to point out that——

Mr. **Boehlert**. You can call me Mr. Chairman any time you want. [Laughter.]

Mr. **Klem**. There is a precedent that has been established already. Nursing homes and hospitals that receive Federal funding must comply with the appropriate addition of the NFPA's Life Safety Code, so in a sense, in some occupancies, where tragedies have shown themselves, as they did in the early 1960's in nursing homes and hospital occupancies, there was such a determination that there should be Federal involvement. The codes, and the level of safety reflected in the codes, were appropriate. No need to rewrite what already exists, and it was implemented, and today if you receive Federal funds in a nursing home, for example, you must comply with that standard, so in a sense there is, when the need has shown itself, as it did in nursing homes in the early 1960's.

Mr. **Boehlert**. Would you say that it's fair to assume that the need has shown itself with respect to hotels?

Mr. **Klem**. I think that the fire problem in hotels is—warrants attention. We've estimated that 1 out of every 6 hotels will have a fire severe enough for a fire department response. This is not a one in a lifetime occurrence, that happens.

In fact, we found in the DuPont Plaza, that there were numerous fires that had happened in the last two weeks. Unfortunately the one on December 31, 1986, resulted in a tragic loss. It took that tragic loss. What about the other five that had occurred. They occur, and we must respond to them. We must take the problem seriously. We must adjust to it. We must integrate programs. We must enforce codes and standards that are there and available to us. And if the building owners and managers are not aware of the hazards that a "small fire" can present, then we're going to lose the battle.

Mr. **Boehlert**. One in six. That's an alarming figure.

Mr. **Klem**. Yes, it is.

Mr. **Boehlert**. One in six hotels will experience some sort of fire?

Mr. **Klem**. That's correct.

Mr. **Gerard**. I think one of the key problems that the Congress would face if they tried to mandate, say the Life Safety Code, that is similar to the mandate that HHS has, or the Veterans Administration has for their hospitals, the problem you would have is, where's my hammer? See, they get funding from the Federal Government. Hotels don't normally, they're not in that loop, so that that's the problem. I think that the Life Safety Code could be mandated, but what would be the consequence for not meeting the mandate. I think that's the corner that we would all have to turn in order to make that realistic.

Mr. **Boehlert**. Mr. Gerard, you know, America Burning cited a 1968 report of the National Commission on Urban Problems and I'll give a quote from that. "Building code jurisdictions are thousands of little kingdoms, each having its own way. What goes in one town won't go in another, and for no good reason." In your opinion, is that statement still true?

Mr. **Gerard**. Yes; categorically, but let me say that through the National Association of Home Builders, and the Counsel of American Building Officials, and NFPA, and a couple of other organizations, we just completed working on a document to begin to draw that together, begin to eliminate those differences, begin to deal with a single unified system for building—for the built environment.

We started off with one and two family dwellings, which are the simplest and easiest to deal with. And it is a commitment of the group that was working together, to gradually work our way through that process, so that eventually, there will be much more uniformity in the code system, throughout the United States, but it is a very, very difficult process.

Mr. **Boehlert**. But I applaud you for what you're doing. My question of you, is what more should we be doing? We have a special responsibility, and what should we be doing? I mean, short of a National Fire Code. I know all the problems that are presented when you even suggest that, but what can we do to ensure more stringent fire codes around the country, more uniform fire codes?

Mr. **Gerard**. I guess given the, as Mr. Bragdon pointed out, given the fact that the codes are adopted and enforced at the local level, State, county, city, that's really the action point.

I believe, I believe that the Federal Government's real responsibility, the real challenge for all of us, who either are elected officials or people who have presumed to advise elected officials on how to accomplish what the Nation needs, I believe it's our challenge to try and identify how you can exercise the leadership, because that's really what we're talking about. We're talking about leadership of our Federal elected officials, to lead the local people in the direction that they need to go. It is a real challenge, and it's one that I think that the Fire Administration has looked at, they have done some wonderful things in that area, and it's an area that, that really is a proper function for the Fire Administration to provide that leadership at the local level.

And as you've pointed out several times, they can't really do that if they don't have a budget. But that is their responsibility. And that is their duty, that is their charge, and to the extent that they do that, they are in fact accomplishing what they should do.

Mr. **Boehlert**. Would I be fair in saying that in line with your request that we exert the leadership that you would suggest, we fight the attempts to drastically cut back on funding the U.S. Fire Administration, the Center for Fire Research and the National Fire Academy?

Mr. **Gerard**. Well, one of the things——

Mr. **Boehlert**. Is that the guidance you're giving us?

Mr. **Gerard**. Well, one of the things that those of us who are members of the joint counsel agreed to do, was not testify since we're all not here today, on the budget issue, so I would—we will have a comment to make and I——

Mr. **Boehlert**. You can rank them out if you'd like. [Laughter.] I've got to run to vote.

Mr. **Walgren** [presiding]. Let me ask a little bit about this area of the NFPA Life Safety Code, and Mr. Lathrop, if the NFPA Life Safety Code had been applied in this building, in this fire, what would have happened?

Mr. **Lathrop**. Under the Life Safety Code, if it was being forced on this structure, the first and second floors would have been mandatorily sprinklered, and as we've heard testimony by many people earlier, the—we would probably have never even heard about the fire, because the fire would have extinguished in the very early stage. There probably would have been a little bit of a nuisance, from a little bit of smoke, a little bit of water, the people would have been removed if the people had been properly trained to remove people on alarm of fire, but they would have been back in the building within a few minutes. The sprinkler system would reset, and we would never be here today.

Mr. **Walgren**. It would have also had smoke detectors, I gather, as well?

Mr. **Lathrop**. There would have been a requirement for smoke detectors in the residential areas, and also due to problems regarding the open stairway, there is several requirements that have been established due to the open stairway, which would have required the sprinklers on the first and second floor, and something else to help mitigate that problem. It probably would have had to been smoke detection on the first and second floor also. That would have had to be something that would have been developed locally, to solve other problems.

Mr. WALGREN. How expensive will it be to put sprinkler systems in first and second floors?

Mr. LATHROP. I couldn't provide that information. You might want to check with Mr. Scarff when he's on later. They've had a lot of experience installing the sprinklers retroactively in hotel type properties, and I couldn't give you a good estimate on that.

Mr. WALGREN. And what do we know about Puerto Rico's adoption of this standard that the National Fire Protection Association has developed through all this process?

Mr. LATHROP. To my knowledge, it is not used in Puerto Rico for hotels. It is used, obviously, for hospitals and nursing homes, because they receive medicare and medicaid funds for their patients, but for hotels, no.

Mr. KLEM. Our information to date indicates that the 1954 code that was adopted in Puerto Rico would have been the model code that the building was built to, in terms of its standard. That has since been modified once, in 1968, and the 1968 code is the current level of standard that is enforced in Puerto Rico.

Mr. WALGREN. The NFPA Life Safety Code requires sprinklers, mandatorily.

Mr. LATHROP. The code establishes specific requirements for new and existing buildings, and there are differences between new and existing, obviously because of the problem of having to deal with existing structures, but there are specific mandatory provisions for existing buildings.

The code goes a great way in trying to provide alternative ways of complying with the code and in doing this, in most of the cases, things are done by incentives. Certain times you have to sprinkle things, other times you do it because something else isn't in compliance.

For example, in this case, you had an open stairway between two levels, the first and second floor, to have that open stairway would have mandated sprinklers on the first and second floor. As far as sprinklers in the upper parts of the building, there were so many significant defects in the facility on the upper levels that the most reasonable economic fire protection that could have been provided would have been to sprinkler the entire building, not just the first and second floor, but I can't say that the code mandates sprinklers. It allows them to be used to offset other problems in the facility.

Mr. WALGREN. How broadly is this Life Safety Code in effect across the country?

Mr. LATHROP. That's difficult to answer. We are used mandatorily by approximately 20 States. That changes as time goes and legislatures change, et cetera. It's used voluntarily, of course, by many of the insurance companies for liability insurance across the country. Of course, the Federal Government uses it voluntarily for a good portion of its buildings. GSA uses it, the Postal Service, Department of Defense. The level of enforcement within those agencies of course varies, depending upon funding and it is being self enforced, so that's difficult to answer.

Mr. **Walgren**. How is it that the impression is that almost 95 percent of hotels are not substantially protected by sprinklers if our NFPA Code is adopted as law by 20 States?

Mr. **Lathrop**. Well, as we mentioned earlier, not only do you have to adopt a code, you have to enforce it. Enforcement is a very important point in answering that question obviously.

Mr. **Walgren**. Do you have any recommendations for the national level?

Mr. **Lathrop**. I can recommend a few things. One, I'd like to encourage the fact that much of the material that makes the Life Safety Code quite unique is what we might call systems approach to life safety. It doesn't just say, this is the only way to do it. A lot of these system approaches are becoming quite sophisticated and a lot of this material is being provided based on research from the Bureau of Standards. The National Bureau of Standards has been an active participant on the Committee on Safety Life and many of its subcommittees for years and years and years, whenever they can participate. They are members.

Much work is being done by the Bureau in these systems approaches including what we have, that we call the fire safety evaluation systems, which are presently in an appendix to the code and give you a method of measuring the life safety in the building numerically. These are being pulled out now into a separate document. We are going to call it systems approach to life safety and we are looking forward to being able to expand this systems approach, which is something which can be computerized and easily measured in all occupancies. Presently, we only have it for a few occupancies.

The other thing I'd like to encourage has been brought out by several people earlier today, for the Federal Government to do what it is encouraging other people to do. We presently have Federal employees staying in hotels that are not necessarily—that are not sprinklered or do not comply with our minimum codes. We have Federal meetings being held in facilities that most people would not want to stay in because of some of the safety criteria, and I would like to encourage the Federal Government to make that as its first step to encourage or mandate that its employees and its meetings be held in fire safe places.

Mr. **Klem**. From a fire investigative standpoint, we would like certainly to encourage the fine work and leadership that the Center for Fire Research is portraying to us in the use of computer fire modeling to assist investigators, provide them tools, so to speak, and making us better able to answer "what if" questions.

This is going to have far reaching consequences not only in fire investigations but in our development of our standards as well, when we are able to answer from a more technical basis, based on scientific principles of physics and chemistry, what if the building were sprinklered. We can answer a lot of those questions. What if the combustible removable partition were a masonry wall. What if there was not highly combustible interior finish on the walls.

These are questions that we are beginning to be able to answer. We would only want to encourage the center to continue with these efforts and make a significant contribution for the technology to transfer to what we perceive our role to be, disseminating that information to the public and the members of the fire service and the fire protection community.

Mr. WALGREN. As I understand it, you could have a hotel in compliance with the code that did not have sprinklers in this kind of ballroom; is that correct?

Mr. LATHROP. For an existing building, it is possible to have it without sprinklers; yes. It would require several other things to be provided but it could be done without sprinklers for existing buildings; yes.

Mr. WALGREN. What would happen if you ran the fire on a hotel that met the code, an existing hotel, didn't have sprinklers, would the same fire have occurred in the same kind of——

Mr. LATHROP. No. This fire couldn't—the fire could have started but the tragedy would not have occurred, because of the significant role played here by the open stairway, and therefore you could not have had a nonsprinklered facility, because of the open stairs.

The Life Safety Code has for decades and decades been extremely stringent when it comes to open stairways because of the very heavy role open stairways have played historically in multiple death fires. Therefore, the fact that the foyer in this facility between the ballroom and the casino was an open foyer, open stairway, it could not have——

Mr. WALGREN. Architecturally, these kinds of facilities—well, I guess there are so many differences, but you couldn't have an appealing wide vista to the blue Caribbean without an open stairway, so supposedly they would then be pushed into sprinkling if they are to be in compliance with the code.

Mr. LATHROP. That's correct. It would be mandatorily sprinklered with that type of arrangement.

Mr. WALGREN. Does NFPA promote these codes with the states, and if so, what was Puerto Rico's response?

Mr. LATHROP. Historically, NFPA has provided codes and standards and left it up to the states or jurisdictions to adopt it and does not have—it has not had a program of going out and pushing for their adoptions, you might say, lobbying for their adoption, and therefore, there is no record where we could say, we went to Puerto Rico, we encouraged them to adopt it and there was no response.

It has been pretty much left to the fact that we are a membership association, left to the members to encourage adoption in their areas. This is an area that we are now starting to embark on and actually encouraging jurisdictions to adopt the code.

Mr. WALGREN. So we have a model code but it was not picked up and therefore the deaths occurred?

Mr. LATHROP. Yes, sir.

Mr. WALGREN. Mr. Miller, it's often been observed and American Burning, as I understand, did as well, that building code jurisdictions are each a little thiefdom to themselves and that what is able to be done in one jurisdiction will be really resisted and not done in another, and therefore, we have to not have any uniform standards.

Is that your feeling of the present day as well as it was supposedly when American Burning was written in the early 1970's?

Mr. Miller. Certainly the local jurisdiction interprets the code and they have the authority to interpret their code, but generally speaking, with the four model code developing groups in the nation, most of the critics that adopt the model codes stick very close to the official interpretations of those codes. I think we have good codes.

I'd like to make a comment about building codes, because we are currently working on issues now like sprinkling new buildings but that will not be going into effect until 1988. The other model codes are doing the same. The new codes usually are not adopted for 2 to 5 years after publication.

Mr. Walgren. And then not for existing buildings?

Mr. Miller. I agree. So, we have to make a clear distinction between existing buildings today, the 95 percent that are not sprinklered, what are we going to do about those? That's not addressed in new construction codes, like the building codes. That takes proactive action at the local level or the state level or at the Federal level, to say we are going to establish minimum standards. A few "Lone Rangers" out there, (communities), are taking the lead in doing that. There are communities that are sprinkling single family dwellings, and buildings over 5,000 square feet. Are we going to do certain things in hotels?

In the fire service, we know that we cannot effectively fight a fire in a nonsprinklered high rise building on upper floors and yet we have dozens of high rise buildings that are not sprinklered all over the country.

So we are going to have to start looking at retroactive provisions for existing residential housing.

Mr. Walgren. Retroactive, minimum standards. We did it with nursing homes.

Mr. Miller. Yes.

Mr. Walgren. And now all nursing homes could not have this kind of an event, this kind of massive flash over event. We still know they have other kinds of events and there are still lives lost, but we set minimum standards for nursing homes, but apparently we have not got to the point of setting minimum standards for public accommodations and particularly large gathering places like this casino and hotel rooms as well.

Mr. Miller. And when you look at all the options, in many cases, with the new technologies, sprinkler systems are more cost effective than doing a whole combination of other things. As well as we build the buildings, you can go in five years later and find that repairmen have knocked holes in fire walls, self closers are removed from doors, and fire protection systems have fallen into disrepair. Many cities do not have effective, complete, comprehensive annual fire inspections, and this is a natural sequence of events that occur. So when you look at all these factors, the sprinkler system technology has developed to the point in the last ten years that it is the most effective option available.

The perception is that it is still too costly. I had a quote the other day from a new building, they were putting a sprinkler system in, for $1.20 a square foot. Now, of course, that's a new building, fairly open industrial type application. The cost can vary tremendously when you talk about existing occupancies and retrofit, but with some of the new flexible piping that is currently available, these costs have been reduced tremendously.

So in many cases, this is the most effective way to deal with the overall situation.

Mr. Walgren. Well, on behalf of the Committee, we want to express our appreciation for your contribution and we look forward to your being a resource to us as we try to discharge our responsibilities and we will be talking with you about your testimony in the future.

Thank you very much.

The third panel, John Scarff, director of Fire Protection for Marriott Corp.; Bill Gunter, fire marshall in the State of Florida; and Elmer Chapman, the deputy fire chief of the New York City Fire Department.

Welcome, gentlemen. We appreciate your patience and your coming to talk to us about this. As we said to the other folks, written statements will be made a part of the record and feel free to diverge or use them to focus on the points that should be made verbally, and that would stick in memory that way.

Let's proceed in the order in which we introduced and then we can have a little discussion after. Mr. Scarff?

## STATEMENTS OF JOHN SENSON "SUNNY" SCARFF III, DIRECTOR, FIRE PROTECTION, MARRIOTT CORP.; BILL GUNTER, FIRE MARSHALL, STATE OF FLORIDA, ACCOMPANIED BY BUDDY DE WAR AND ELMER F. CHAPMAN, DEPUTY FIRE CHIEF, RETIRED, NEW YORK CITY FIRE DEPARTMENT

Mr. Scarff. Ladies and gentlemen, this morning you've heard testimony of numerous officials regarding the DuPont Plaza fire in San Juan. What is especially tragic is that this same—if this same committee had been convened in 1946, immediately following the Winecoff Hotel fire in Atlanta where 119 lives were lost, the testimony would have been almost the same. The important difference is now that we have technology available that can help prevent occurrences such as the DuPont Plaza fire, and other hotel fires that have made headlines in recent years.

At the same time, if you were to ask any fire chief or fire officer in the United States today about the possibility of future major fires and tragic loss of life, you would be told it could happen in any city in the United States at any time.

Marriott Corp. began its program of sprinkler installation and retrofitting because we believe sprinklers are the best way to protect our guests and employees from the dangers of fire. In early 1983, we were in the process of retrofitting several hotels with sprinklers, and encountering some installation problems. Coincidentally, at the same time, we were planning a demolition of a former GSA building in San Francisco to make room for a future Marriott hotel.

Because we believed that the new sprinkler technology with fast response heads and CPVC piping, might be the answer to our installation problems, we decided to use the San Francisco as the site for a major test. I assembled a group of more than 40 fire chiefs, fire marshals, and building officials to develop a set of scenarios that would allow all concerned to evaluate the new technology, and we began planning for Operation San Francisco. This test took place in 1983. Over 1,000 fire officials from all over the country were all on hand.

The following videotape will show you what we learned, and what was accomplished. When it concludes, I'd like to show you a series of slides that show how Marriott has continued to install sprinkler systems in new and existing buildings, if I may.

Mr. **Walgren.** Let's turn the monitor there so the audience can see as well. It's squared off, we can all take a look. Is there a way to turn down the lights, or is that not possible given the TV?

[A videotape was played.]

Mr. **Walgren.** Let's turn on the lights now. It might give us a little bit more room.

Mr. **Scarff.** I now have a series of slides.

We of course use adequate signage in these—in the buildings when we're going to install the sprinkler system, letting the guests know that we're going to be installing a life safety system. But we utilize the existing standpipe risers that are already, in most part, in place in most all these buildings, and utilize that as our water supply system.

[VuGraph.]

If you'll note here we've gone down in the guest room corridor and punched holes into the guest room and we're getting ready to install the piping within that corridor.

[VuGraph.]

Here the sprinkler installers are measuring the pipe that is already into the room, and it's being out in the corridor now, and they'll be connecting that. The pipe is being connected, we're utilizing either polybutylene or CPVC piping.

[VuGraph.]

Here they're showing you how to glue CPVC piping.

[VuGraph.]

That's the gluing process again.

They're doing the installation within the guest room. Drilling the hole for the sprinkler piping to come through the bathroom ceiling, or the drop ceiling in the vestibule.

[VuGraph.]

The piping is being installed in the guest room.

[VuGraph.]

And this is the corridor. You'll note that there's very little dirt or residue in the corridor, so we're not doing too much covering in the corridor. Bearing in mind that this installation is going on while these guest rooms are occupied. The rooms were occupied this morning, the people checked out, and they will be occupied again tonight.

[VuGraph.]

Again, showing a piping being hung.

[VuGraph.]

This is just showing how the installation process takes place. How the pipe is cut, in the basement of the hotel, and transported up to the floor where it's being installed.

[VuGraph.]

The pipe being glued on the guest room floor or in the guest room corridor.

[VuGraph.]

Now we're doing a soffiting, which would enclose the pipe. We would not let the pipe be exposed. We're enclosing the pipe to make it look aesthetically pleasing.

[VuGraph.]

Again, the hanging of the pipe into the guest rooms. Showing how the enclosure is buttoned up, ready for the soffit.

[VuGraph.]

We're ready to install the soffit now in this corridor, to make it pleasing.

[VuGraph.]

We're here running a hydrostatic test which is part of the sprinkler installation process, and we test this pipe at 50 pounds higher than we test steel pipe, for no other reason that many people had questioned use of plastic pipe. We're just trying to prove to them that it far exceeds the capabilities of the other stuff.

[VuGraph.]

Installing—finally installing the sprinkler heads.

[VuGraph.]

Here's the soffit as it is being built before it's finished, to enclose the pipe.

[VuGraph.]

Again, the soffit being finished, now ready for it's coat of either what we call popcorn, the way we paint the ceilings and the corridors, or we may many times do it in vinyl.

[VuGraph.]

Again, showing how it's been enclosed.

VuGraph.]

Enclosed in the guest room as well.

[VuGraph.]

Again, the signage that we're using.

[VuGraph.]

Now here's the soffit being vinyled to match the wall. And you'll note that there is a maid's cart on this floor, so these rooms were sold and occupied last night, and they of course will be sold and occupied again tonight.

[VuGraph.]

Again showing a maid's cart during the room cleanup, at the same time we're installing sprinkler pipe.

[VuGraph.]

Here's a finished corridor, or a finished elevator lobby, and you can how the soffit has been coated with the same coating that we use on the ceiling.

[VuGraph.]

Now, this is a guest room corridor, and you can see how they've run vinyl on that to make it pleasing.

[VuGraph.]

Another shot of that same corridor.

[VuGraph.]

Another shot of another corridor. This was a corridor in Miami, but you can see that it does not detract from the look of the building.

[VuGraph.]

Another corridor that's been done with vinyl. The soffit has been done with vinyl.

[VuGraph.]

Here's a guest room. Two sprinkler heads in a guest room. One out over the bed area, and one in the vestibule as you walk into the guest room. You'll note that there's also a single station smoke detector within that guest room.

[VuGraph.]

Here's the public space. This is, of course, what many people feel is a major problem sprinklering buildings—that what do you do with the public space. The black dots on here are not sprinkler heads. They are cone lights instead—the sprinkler heads that you can very—they're not very readily noticeable. Very small dots in the center in some of the ceiling tile.

[VuGraph.]

Another shot of public space. This is in a ballroom. You can note the large chandeliers in the center.

[VuGraph.]

Another restaurant space that's been sprinklered in a retrofit configuration, and I don't think that we destroyed the looks of that as well.

The soffit is built, or is made up of drywall, and they cut it in the basement and bring it up. They cut 5 inch pieces and 7 inch pieces. We bring the pipe soffit up, 5 inches from the wall, and 7 inches down from the ceiling. A sheet of drywall is 8 foot by 4 foot, so there's no waste. We cut 5 5-inch pieces, and 5 7-inch pieces, and there's no waste at all. So we then transport it up to the floor and install it.

[VuGraph.]

This is some of the hotels that we've done. We've done the Miami hotel; the New Orleans hotel; the 45 story portion there, the Boston—Newton Massachusetts; Los Angeles Airport; the Denver hotel; this is Fort Lauderdale marina; this is Saddle Brook in New Jersey; Lincolnshire in Illinois, outside of Chicago. This is the Springfield, MA hotel that was just been retrofitted; Dallas, Texas. I think this is Kansas City Airport, and then this is Bloomington, MN; Hunt Valley in Maryland; and I might add that this is a hotel we just bought in Bermuda, the Castle Harbor, and it's the first hotel in Bermuda that's been sprinklered, and we sprinklered that in a retrofit configuration as well. And this is one of the courtyards that we're building 300 of throughout the country. These are two story hotels that normally would not be required to be sprinklered, but everything that Marriott is building today is totally sprinklered.

That's a quick overview of what we're doing at Marriott. I speak only for my company, Marriott, and not for the industry. But sprinklers are the method that we have chosen to protect our guests and employees from fire.

Thank you, and I'll be glad to answer any questions you might have.

[The prepared statement of Mr. John Senson "Sunny" Scarff III, follows:]

# Hotel Fire Safety -- What Is Needed To Protect Our Citizens

Ladies and gentlemen, this morning you have heard testimony from numerous officials regarding the Dupont Plaza fire in San Juan. What is especially tragic is that if this same committee had been convened in 1946, immediately following the Winecoff Hotel fire in Atlanta where 119 lives were lost, the testimony would have been almost the same. The importance difference is that we now have technology available that can help prevent occurrences such as the Dupont Plaza fire, and the other hotel fires that have made headlines in recent years.

At the same time, if you were to ask any fire chief of fire officer in the United States today about the possibility of future major fires and tragic loss of life, you would be told that it could happen in any city in the United States at any time.

Marriott Corporation began its program of sprinkler installation and retrofitting because we believe sprinklers are the best way to protect our guests and employees from the dangers of fire. In early 1983, we were in the process of retrofitting several hotels with sprinklers and encountering some installation problems. Coincidentally, at the same time we were planning the demolition of a former G.S.A. building in San Francisco to make room for a future Marriott hotel.

Because we believed that new sprinkler technology, with fast reacting heads and CPVC piping, might be the answer to our installation problems, we decided to use the San Francisco building as the site for a major test. I assembled a group of more than 40 fire chiefs, fire marshals and building officials to develop a set of scenarios that would allow all concerned to evaluate the new technology, and we began planning for "Operation San Francisco." The test took place in October 1983. Over 1,000 fire officials from across the country were on hand.

The following videotape will show you what we learned and what was accomplished. When it concludes, I would like to show you a series of slides that show how Marriott has continued to install sprinklers in its new and existing hotels.

(after videotape and slides conclude)

That, ladies and gentlemen, is a quick overview of what we are doing at Marriott. I speak only for my company, not for the industry. But sprinklers are the method we have chosen to protect our guests and employees from fire.

Thank you. I'd be glad to answer any questions you might have.

Mr. Walgren. Well, we appreciate that display very much, and it clearly shows that it can be done, and you're doing it, and you deserve a lot of credit for it.

Let's turn to Mr. Gunter, a Fire Marshall from the State of Florida.

Mr. Gunter. Thank you very much, Mr. Chairman, Congressman Boehlert. I would like to introduce Mr. Buddy De War, who is the director of our division of State Fire Marshalls in Florida, who is at the table with me as well.

We are people surrounded by technological wonders, long accustomed to believing that nothing is impossible. The importance we attach to human life leads us to believe that effective technology at whatever cost, will naturally be expended to keep us safe. But paradoxically, the United States suffers a higher rate of fatalities and property loss due to fire, than any other industrial nation, despite the advanced technology our firefighters can bring to bear.

Recent tragic hotel fires have brought the light of inquiry into sharper focus on the problems of fire in high-rise public lodging facilities. The factors that contribute to fire losses are complex and interrelated. What we've learned, we've learned largely through tragedy. But we have learned, and we've come to believe that the solution to the fire problem, that for so long has bid us defiance, is like so many other riddles, rather simple once found. It is automatic fire sprinkler protection.

National Fire Protection Association research shows, and it has been attested to today, that no fire in fully sprinklered buildings has ever resulted in more than two fatalities unless there has been an explosion. In counterpoint to the recent, much publicized tragedies of the MGM Grand and DuPont Plaza fires, where sprinkler protection was partial or nonexistent, let's look at a recent hotel fire in Clearwater, FL, that had quite a different outcome.

Clearwater's Sea Wake Inn suffered a fire in it's elevator equipment room shortly after 1:30 a.m. in the morning. The lives of over 300 sleeping guests were at risk. Under Florida law, the hotel owners could have waited until 1993 to install sprinklers. Luckily they chose to make the $38,000 investment 7 years early. The sprinkler system contained the fire, and the guests were able to go back to their rooms that very same night.

As State Fire Marshall, I was proud of the spirit of cooperation and concern for public safety that inspired the hotel's actions. But it certainly didn't escape my notice as State Insurance Commissioner, that out of a potential $6.4 million insurance payout, the fire only cost about $100,000. That kind of loss prevention keeps insurance rates lower for everyone.

Automatic sprinkler requirements vary from state to state, and city to city, as has been pointed out in your hearing today. Florida is 1 of only 2 States that requires sprinklers in public lodgings by statute. The chilling fact is that 95 percent of the nation's 50,000 hotels are not sprinklered.

One issue that bears on the mandatory sprinkler question is whether codes should be retroactively enforced. Some argue that once a building is found in compliance with a construction code, and a certificate of occupancy is issued, later standards should not be applied. But to those of us who bear the responsibility of protecting and saving lives, the issue is a single one, a simple one. Public facilities built years ago cannot, without retrofitting, provide the level of fire protection, that modern technology can provide. And which the public is rightfully coming to expect.

I therefore recommend to this Subcommittee that Congress adopt a law nationally, like that passed in Florida, to require sprinklers in all new public lodgings and retroactively in existing lodgings within a reasonable period of time. Such a law should represent a foundation of fire protection on which the individual states have the discretion to design their own requirements.

The Florida law came as a result of a thorough analysis of the fire safety situation in our State lodgings. This analysis, undertaken with the cooperation of the lodging industry, showed us two things. First, that many hotels, particularly in some of our older cities, were built under antiquated codes, and that little had been done over the years, to update safety systems. Second, we found that many of our newer hotels were built, not only without automatic sprinkler systems, but often in violation of existing codes. In many cases, codes were not properly applied because of a lack of knowledge on the part of architects, builders, code officials, building owners, and sometimes even fire officials.

Typical violations included inadequate fire resistant materials in stairwells, horizontal exits in corridors, inadequate fire wall requirements in larger properties, excessive travel distances to exits, and possibly toxic interior finishes.

Correcting these violations across the board would clearly have worked a severe economic hardship on the property owners, but many of the violations, excessive travel distances to exits, dead end corridors, and poor fire resistance would become much less threatening in a fully sprinklered building. Still, the cost of sprinkler retrofitting, especially in downtime, on revenue producing space, was considered prohibitive.

Fortunately, technology has come to the rescue, as testified to just a moment ago by Mr. Scarff. New, lightweight, flexible sprinkler pipe can now be installed more quickly than the old black iron pipe. Using the new technology, many hotels can install sprinklers at the rate of one floor a day, as opposed to one floor a week using the old pipe. Thus, the time the guest room is not revenue producing, is minimized. Marriott has had a very good experience in that respect.

With the new sprinkler technology in place, many dangers are mitigated. Some fire code and building code violations, like improper door swing, and places of assembly, could not be allowed, even in a sprinklered building, but some other requirements could be lessened.

However the public lodging industry was concerned that if they agreed to retroactive installation of sprinkler systems, local jurisdictions might still require all the mitigated code violations to be corrected.

This concern was addressed, Mr. Chairman, by providing for a uniformly applied Fire Code for existing public lodging establishments. Providing a single common procedure for bringing buildings into compliance, with fire safety standards, made many hoteliers more receptive to mandatory automatic sprinkler requirements.

Statewide costs in Florida were estimated at $175 million, and hoteliers wanted a reasonable time to finance this expenditure. We agreed on 7 years.

Many fires in public lodgings are caused by guests falling asleep with lighted cigarettes. Bedding fires cause heavy smoke, but little heat. Guests can suffocate before there is sufficient heat to activate the sprinklers. For that reason, smoke detectors were also included in our hotel fire safety package.

To summarize, Florida law currently requires smoke detectors in all guest rooms for one and two story public lodgings. In lodgings 3 stories or more, single station smoke detectors must be installed in each guest room no later than October 1 of 1988. All public lodgings of three stories or more where guest rooms open into an interior hallway, and all public lodgings seven stories or higher, must be sprinkled by October 1, 1990.

There are three 1-year extensions available for the sprinkler requirement I had mentioned before. The first extension requires that plans be completed. The second extension requires the existence of a contract for the work, and the third requires a completion date. All installations, however, must be completed by October 1 of 1993.

The passage in Florida of what we feel is the most progressive public lodging fire safety law in the country, might not have been possible, had not it been strongly supported and endorsed, by the Florida Hotel and Motel Association, and the lodging industry in general. They agreed with us that the new law provide maximum fire safety protection at a minimum cost to the consumer. Failure to comply with our public lodging fire safety law will bring serious consequences. The Florida Division of Hotels and Restaurants will begin delicensure proceedings for those establishments not in compliance after the target dates.

The industry has been thoroughly informed of the fire safety requirements, and is aware that licenses of those who fail to comply will be revoked. Throughout the history of the world, mankind has witnessed fires of such terrifying proportions, that fire has in itself, become a symbol of cataclysm and final destruction. It is my devout wish, as it is the wish of any State Fire Marshall, never to have a famous fire, but the wise man, as the poet says, must be wise before the event, not after.

I believe a comprehensive sprinkler law for public lodgings at the Federal level would embody that kind of wisdom, and help make disasters such as we have seen in recent years, unmourned vestiges of the past.

Thank you for the opportunity to share some of Florida's fire safety experiences.

[The prepared statement of Mr. Gunter follows:]

# Hotel Fire Safety: What's Needed to Protect Our Citzens?

Remarks to the U.S. House of Representatives
Committee on Science, Space and Technology
By Florida State Fire Marshal Bill Gunter

March 5, 1987 -- Washington, D.C.

Mr. Chairman, Members of the Committee, we are a people, surrounded by technological wonders, long accustomed to believing nothing is impossible. The importance we attach to human life leads us to believe that effective technology, at whatever cost, will naturally be expended to keep us safe.

But paradoxically, the United States suffers a higher rate of fatalities and property loss than any other industrialized nation, despite the advanced technology our firefighters can bring to bear. Recent tragic hotel fires have brought the light of inquiry into sharper focus on the problems of fire in high-rise public lodging facilities.

The factors that contribute to fire losses are complex and interrelated. What we've learned, we've learned largely through tragedy. But we have learned. And we have come to believe that the riddle that for so long bid us defiance is like so many riddles, rather simple once found.

It is automatic fire sprinkler protection.

Reseach by the National Fire Protection Association has shown that no fire in fully sprinklered buildings has ever resulted in more than 2 fatalities, unless there has been an explosion.

This rather remarkable finding together with the recent comment by Ed Wall, Assistant Administrator of the U. S. Fire Administration, that, for a fire like that in Puerto Rico's Dupont Plaza -- started by a sterno can placed under some boxes -- "two sprinkler heads could have put the fire out", deserves that close attention of public officials responsible for fire safety.

Another professional testament to the efficacy of automatic sprinkler systems came from Fire Chief Roy Parrish of the Clark County, Nevada Fire Department, who was responsible for fire suppression at the November 1980 MGM Grand Hotel fire.

In Parrish's opinion, a limited sprinkler system, adjacent to the fire's point of origin, stopped the fire from expanding down another corridor which led to the hotel's high rise tower.

Parrish felt that the huge volumes of smoke and heat that might have been channelled to the upper floors, had it not been for the limited sprinkler system, could have killed half of the 7,000 to 8,000 people in the hotel at the time. As it happened, the fire deaths at the MGM Grand amounted to a little more than one percent of those registered, as opposed to ten percent of those registered at the Dupont Plaza where no sprinklers were in place.

In counterpoint to the tragedies of the Dupont Plaza and MGM Grand fires, let us look at a recent hotel fire in Clearwater Florida that had quite a different outcome.

Clearwater's Sea Wake Inn suffered a fire in its elevator equipment room shortly after 1:30 a.m. The lives of over 300 sleeping guests were at risk in what could have been a major tragedy.

Under the Florida law, the owners of the hotel could have waited until 1993 to install sprinklers. Luckily, they chose to make the investment of $38,000 to have the 110-room hotel protected by sprinklers seven years early. The sprinkler system contained the fire and the guests were able to go back to their rooms that same night.

As State Fire Marshal, I was proud of the spirit of cooperation and concern for public safety that inspired the hotel's actions. But it didn't escape my notice, as Insurance Commissioner, that out of a potential $6.4 million insurance payout, the fire only cost about $100,000. That kind of loss prevention keeps insurance rates lower for everyone.

Automatic sprinkler fire code requirements for public lodgings -- which include hotels and motels -- vary significantly throughout the nation. The Life Safety Code promulgated by the National Fire Protection Association doesn't mandate automatic sprinkler systems in new or existing hotels. Some model building codes require sprinkler systems in structures over 75 feet but don't address high-capacity public lodging facilities less than 75 feet high.

Florida, like some other states and major urban areas, requires sprinkler systems in public public lodgings. But 95% percent of the nation's 50,000 hotels are not sprinklered. And not all good laws are well-enforced. Good codes mean little unless they are followed and strictly monitored.

One question that has been discussed and debated for many years throughout this country is whether codes should be retroactively enforced. Some argue that once a building is found in compliance with a construction code and a certificate of occupancy is issued, local jurisdictions should be precluded from applying new standards ex post facto.

But to those of us who bear the responsibility of protecting and saving lives, the issue is a simple one. Public facilities built years ago, cannot -- without retrofitting -- provide the level of fire protection that modern technology can provide and which the public is rightfully coming to expect.

As a consequence, I recommend today that Congress adopt for the nation a law like that passed in Florida, with the support of the public lodging industry, to require that sprinkler systems be installed in all new public lodgings and retroactively in existing lodgings within a reasonable period of time. Such a law should represent a floor of fire safety protection on which the individual states have the discretion to design their own requirements.

The 1970 Uniform Building Code, the code that applied to construction of the MGM Grand, had been adopted in response to an earlier tragic hotel fire -- the December, 1946 Winecoff Hotel fire in Atlanta which killed 119 people. Conditions which contributed to the Winecoff fire, and which the 1970 code was designed to address -- inadequate exits and corridor widths; inadequate emergency lighting and exit sign visibility; inadequate fire-resistance in construction and unprotected vertical openings -- were conditions present in the MGM Grand in violation of that code.

An equally tragic historical parallel can be drawn between the 1942 Coconut Grove nightclub fire in Boston and the recent fire at the DuPont Plaza Hotel in Puerto Rico. In the Coconut Grove fire, 492 people died chiefly because the nightclub exits opened inward against the crush of frantic people trying to escape.

Similarly, one of the main factors emerging in the early analyses of the DuPont Plaza fire was that a casino exit door swung into instead of away from the flow of traffic. Grisly though it is, the picture that the DuPont Plaza fire presents us, with 66 of the 96 fire fatalities found pressed against the inward-swinging casino doors must make us ask whether we are learning from our history.

As you know, tourism is Florida's largest industry and we are very proud of the qualities that bring people to our state. In order to insure that Florida continues to be a safe, as well as attractive haven for vacationers, we thoroughly evaluated the fire safety situation in our public lodgings.

This analysis, undertaken with the close cooperation of the hotel and motel industry, showed us two things. First, that many hotels, particularly in some of our older cities, were built under antiquated codes and that little had been done over the years to update their safety systems.

Second, we found that many of our newer hotels were built -- not only without automatic sprinkler systems -- but in violation of existing codes. In many cases, codes were not properly applied because of a lack of knowledge on the part of architects, builders, code officials, building owners and sometimes even fire officials.

Given that many public lodging establishments were not in compliance with the codes, we embarked upon a program to determine the most feasible and economical way to improve life safety in these buildings.

Typical violations included inadequate fire resistance in stairwells, horizontal exits, and corridors; inadequate fire wall requirements in larger properties; excessive travel distances to exits; and possibly toxic interior finishes.

Correcting those violations across the board would clearly have worked a severe economic hardship on the property owners. One alternative seemed to be installation of automatic sprinkler systems. Many typical violations -- excessive travel distances to exits, dead-end corridor distances and poor fire resistance -- become less threatening in a fully sprinkled building. Unfortunately, the cost of retroactive sprinkler installation -- especially in down-time for revenue-producing space -- was considered prohibitive.

Fortunately, new technology came to the rescue. Sprinkler systems using new light-weight, flexible piping can now be installed more quickly than the old black iron pipe systems. Using the new technology, many hotels can install sprinklers at the rate of one floor a day as opposed to one floor a week using the old technology. Thus, the time the guest room is not revenue-producing is minimized.

With the new sprinkler technology in place, many dangers are mitigated. Some fire code and building code violations, like improper door swing in places of assembly could not be allowed, even in a sprinklered building, but some other requirements could be lessened.

However the public lodging industry was concerned that if they agreed to retroactive installation of sprinkler systems, the fire service community might still require all of the mitigated code violations to be corrected. This concern was addressed by providing for a uniformly applied fire code for existing public lodging establishments.

Providing a single common procedure for bringing buildings into compliance with fire safety standards made many hoteliers more receptive to mandatory automatic sprinkler requirements.

Another hurdle to be overcome was the fixing of compliance time frames. The financial impact of Florida's public lodging sprinkler law was estimated to be around $175 million. Hoteliers wanted a reasonable time to finance this expenditure. Time was also needed to ensure that the systems were properly engineered. We agreed on seven years.

A number of Florida hotels are on the National Registry of Historical Places. In order to protect the historical character of those buildings, provisions were made in our law to allow special fire protection systems to be installed. The Cloisters Building at the Boca Raton Hotel and Beach Club is a good example. The ornate ceiling of this elegant hotel would have been marred by a traditional sprinkler system, so we provided that sidewall sprinklers could be used.

We were also concerned that many fires in public lodgings are caused by guests falling asleep with lighted cigarettes. Bedding fires cause heavy smoke but little heat. Guests can suffocate before there is sufficient heat to activate the sprinklers. For that reason, smoke detectors were also included in our hotel fire safety package.

To summarize, Florida law currently requires smoke detectors in all guest rooms of one and two-story public lodgings. In lodgings three stories or more, single-station smoke detectors must be installed in each guest room no later than October 1, 1988. All public lodgings of three stories or more with guest rooms opening into an interior hallway, and all public lodgings seven stories or higher, must be sprinklered by October 1, 1990.

There are three one-year extensions available for the sprinkler requirement. The first extension would require that plans be completed. The second extension would require the existence of a contract for the work, and the third requires a completion date. All installations must be completed by October 1, 1993.

The passage in Florida of what we feel is the most progressive public lodging fire safety law in the country might not have been possible had it not been strongly supported and endorsed by the Florida Hotel and Motel Association and the lodging industry in general. They agree with us that the new law provides a maximum fire safety protection at a minimum cost to the consumer.

Failure to comply with the public lodging fire safety law will have serious consequences. The Florida Division of Hotels and Restaurants will begin delicensure proceedings for those establishments not in compliance after the target dates. The industry has been thoroughly informed of the fire safety requirements and is aware that licenses of those who fail to comply will be revoked.

You have heard today from Sonny Scarff of the Marriott Corporation about the outstanding job Marriott is doing to protect their guests throughout the country. In fact, one of their pilot projects in the application of the new fire sprinkler technology occurred within the State of Florida. Many of the tests of the new technology were conducted by the Marriott Corporation at an older hotel in the Fort Lauderdale area.

Many existing hotels in Florida have already made progress in complying with our aggressive sprinkler laws. We frequently hear from design professionals asking for an official interpretation of code applications on existing hotels. We feel we will have substantial compliance with this sprinkler law by October 1, 1990. Those hotels not in compliance will be swiftly dealt with.

But we will feel comfortable about hotel fire safety in Florida only after our target dates have been met. In the past 18 months I have ordered two unsafe properties closed. Both of the properties were public lodgings that had been neglected over the years so that fire safety problems created totally unacceptable life safety conditions.

Throughout the history of this world, mankind has witnessed fires of such terrifying proportions that fire has, in itself, become a symbol of cataclysm and final destruction. It is my devout wish, as it is the wish of any state fire marshal, never to have a famous fire. But the wise man, as the poet says, must be wise before the event -- not after.

I believe a comprehensive sprinkler law for public lodgings at the federal level would embody that kind of wisdom and help make disasters such as we have seen in recent years, unmourned vestiges of the past.

Mr. **Walgren**. Thank you, Mr. Gunter. We appreciate that very much, and it's as great example of the fact that states can lead the way in our system and be examples for others to follow, and we certainly should take a lot of confidence that we can act more broadly when we see it already done by an entity as complex as the State of Florida, and you really have our admiration.

Let me turn to Mr. Chapman. Mr. Chapman is from the New York City Fire Department. I understand you may not have a formal statement, but we would be pleased to hear any reactions or comments that you might like to make, Mr. Chapman.

Mr. **Chapman**. Thank you, Mr. Chairman.

I have the advantage of being the last speaker scheduled, so I can benefit by everyone else's presentations.

I spent 37 years in fire suppression in New York City, the last 12 years of which were spent in midtown Manhattan, which involved the hotel district. And I had one of the largest fires in a hotel in New York City. Luckily, nobody here ever heard about it.

I evacuated 3000 people into Madison Square Garden. I had 300 firefighters on the scene within 30 minutes. The involvement was as large as the involvement we have here in the ballroom. It involved the ballrooms of this hotel.

The reason you did not hear about that fire was that there were no injuries, and there were no fatalities. Though it made the papers on page 6 for one day, that was it.

The reasons were, we had compartmentation. We would have sprinklers in that hotel right now.

In Puerto Rico, we have conditions in Puerto Rico right now that you could have a fire developing in one of the hotels within a couple of miles of the DuPont Plaza, which would be more disastrous and of a larger magnitude and more fatalities, because the conditions in some of the hotels that I inspected in Puerto Rico are worse than what was in the DuPont Plaza.

Legislation—or the investigating committee has been working in Puerto Rico to develop a satisfactory code. The code that's in Puerto Rico at the present time is hardly satisfactory, which was developed in 1968 and has had no updates—not one update. With everything that's happened in the United States in the last 20 years, the Commonwealth of Puerto Rico did not see fit to update their code.

I also have here the New York City Building Code, which was promulgated in 1968. It was much more comprehensive when developed in 1968, and I've gone through here—I have not found a page that has not been updated since 1968.

You've got to realize that local codes are not technical documents. Local codes are political documents. And when you try to legislate through and get changes into the codes, you will find the lobbies that will be generated are overwhelming.

We need the Federal Fire Administration. We need the National Fire Academy, and we need the National Bureau of Standards to give the fire chiefs the ammunition to come up against these lobbies.

Right now in Puerto Rico, when they're talking about retrofitting sprinklers, the hotel industry is already getting their ammunition going saying, "If you legislate sprinklers, you'll put half the hotels out of business."

Well, if that's the case with what I've seen, they should be out of business.

You've asked the question here many times this morning: What can the Federal Government do?

If you check the registrations in the hotels, you'll find that the hotel industry, anyplace in the United States, is involved in interstate commerce, and when it's involved in interstate commerce, the Federal Government can legislate. And I recommend, as a minimum, that the Life Safety Code 101 be adopted throughout the United States.

It has been said here at the table this morning that Puerto Rico, as far as fire safety goes, has a concrete mentality, and this is one of the big things that has impressed all the investigators from fire departments that have gone down to Puerto Rico. We saw this years ago in Sao Paulo in the Andoras Building and the other fires in South America. Those were structurally good, reinforced concrete buildings, and the jurisdictions felt that that was all they had to do as far as fire safety went.

They have been proven wrong. They were proven wrong here in Puerto Rico. You cannot stop with supplying just a concrete building. You've got to control the interior finish that goes into those buildings.

Hotel operators have an obligation to provide for the safety of the guests that patronize their establishments. They must do much more than comply with the local code. Whenever there's a fire, the hotel operator says, "I complied with all the local codes." To me, that's like scratching your fingers on a blackboard. It's the same as if I go into a restaurant, and the restaurant operator says, "I comply with all the local health codes in serving my food." I'm not interested in that. What is the quality of your restaurant? What is the quality of your hotel?

Mr. Sonny Scarff has gone a long way to show the hotel industry what can be done. It's been asked here many times today: What's the cost of installing sprinklers? And our argument in New York is, it's as cheap as putting the carpets on your floor. If you're willing to upgrade the decor, how about upgrading the fire safety?

New York City, at the present time, has probably one of the best codes throughout the United States, but we still do not require all our hotels to be retrofitted. Our new hotels, yes, must be fully sprinklered. We have about five new hotels that are fully sprinklered. One happens to be a Marriott.

We have about five hotels in New York City that have upgraded. But we have hundreds and hundreds of others that have not. In general, the saying in New York City is: If you want a sprinklered hotel room, you go to the Bowery where you pay one dollar a night, and you'll get a sprinklered room.

What can the hotel industry do? The hotel industry can give more emphasis that fire safety is recognized as a sellable product. It's the obligation of the hotel industry to provide for safe guest rooms. When I go into a hotel, be it in New York, be it in Chicago, be it in Puerto Rico, I expect to be offered premises and a room and facilities that will not jeopardize my life.

Some of the conditions I've seen in Puerto Rico on hotels, I couldn't believe happened, I couldn't believe existed in this day and age. The technology, the knowledge, what's been learned, what's been gleaned from all these fires that we've had in hotels—and we call that "tombstone legislation;" that's the only time the fire service can get legislation put through. When we have fatalities, we can get the legislation through. If we don't get it through fast, we lose it.

Some of the conditions in the DuPont Plaza that led to the fire fatalities was the extensive use of combustible interior finish. It was a Type I building in Puerto Rico, and they call it a fireproof building. We've known for years and years that there's no such thing as a fireproof building.

They allowed combustible interior finish on the walls and ceilings to be used, and the only restriction was that it not be more than one inch in thickness. This is a ridiculous code section. It has nothing to do with fire safety.

In public buildings, they allow interior finish to be used if the fire spread is less than the fire spread of wood. They don't even say what kind of wood. Red oak is usually used as a standard, and red oak has a fire spread of 100. The highest recommended use of interior finish in a place of public assembly is 25. Being that they said "wood," the authorities or the construction people could go and use pine, which has a fire spread of 300.

I went through the hotels, and I came up with the two hotels that I inspected while I was in Puerto Rico with 28 items of violation of general safe practice for hotels. I'm not going to go through reading out these 28, but I will submit them if they want to be published in the record.

So what can the Federal Government do? First of all, look at your building here. Look up. This is a place of public assembly. If this was in New York City, it would be required to have sprinklers. This is a new building.

One of our problem buildings in New York City was a GSA building, the Veterans Administration, a fully sprinklered office building. Somebody decided to update the decor, and they disabled the sprinkler system. It took us a couple of years of negotiation with GSA officials to get that sprinkler reinstalled in the building.

I ask that the Federal Government, using the Interstate Commerce Commission, that the hotel industry has engaged in, require sprinklers in all hotels in the United States.

I have one more paper here that I lost in the shuffle, because I got out of context, but every time you deal with the real estate interests and you tell them, "We want sprinklers," they want—"Well, what other alternatives are there?"

There are no other alternatives. There's no gimmicks. There's no tradeoffs. They're no matrix. There's nothing that satisfies the need for sprinklers in a public building.

Thank you.

[The prepared statement of Mr. Chapman follows:]

STATEMENT OF ELMER F. CHAPMAN
DEPUTY CHIEF, FIRE DEPARTMENT
NEW YORK CITY, RETIRED
BEFORE THE
HOUSE SUBCOMMITTEE
ON SCIENCE, RESEARCH AND TECHNOLOGY
ON MARCH 5, 1987

## HOTEL FIRE SAFETY

Mr. Chairman my name is Elmer F. Chapman I am a retired Deputy Chief of The New York City Fire Department. I was with the New York City Fire Department for 37 years serving the last 12 years in midtown Manhattan which contains the Hotel District of New York City. I was in command of many hotel fires during this time. I was in command of one of the largest hotel fires in New York City, one that you never heard of because it was a successful fire, no fatalities and no injuries. It appeared in the newspapers on page 6 for one day and was quickly forgotten because it was not good media. It required the evacuation of 3000 people in the middle of the night who were temporarily housed in Madison Square Garden. It required the services of over 300 fireman who were on the scene in 30 minutes. This fire was of equal magnitude to the fire in the ballroom of the Dupont Plaza Hotel but it was contained because the building was well compartmented.

I wish to thank the Chairman Doug Walgren and members of this Committee for this opportunity to address the committee. I wish to make recommendations as to what should be done on a federal level to reduce the terrible loss of life in hotels throughout the United States, using the fire at the Dupont Plaza in San Juan Puerto Rico which occurred on New Years Eve, December 31, 1986, as a reference point.

We should not confuse the cause of the ignition of this fire with the cause for the loss of the 96 lives. These are two very distinctive and different factors. Regardless of the cause of the ignition of this fire, there should not have been the loss of 96 lives. With the technology that is available today, with what is known about the containment of fire, the procedures for the safe evacuation of occupants and the systems that are available for the detection and suppression of fire, this loss of 96 lives and injury to 150 persons is inexcusable. It is possible for every hotel to provide their guest with a reasonable degree of safety at a cost that is within the reach of every hotel operator. It is unconscionable to not do so. I have a great fear that the real cause of the loss of life in this fire will be lost in the media coverage of the criminal aspects.

Hotel operators have an obligation to provide for the safety of the guest that patronize their establishments. The statement of hotel operators that they complied with local codes is not adequate. It is the equivalent of a restaurateur saying that his food complies with the local health code. They must do more if they expect to stay in business. They should be willing to provide for the safety of their guest to the limit of the technology that is available. They should be willing to update their fire safety just the same as they are willing to update their decor. Hotels in United States both new and old should as a minimum requirement comply with the "Life Safety Code 101" If you check the guest registers of the major hotels I am sure that you will find that they are engaged in interstate commerce. This would permit the Federal Government to provide legislation that would insure the traveler that whatever hotel he stays in the United States he will be provided with a reasonable degree of safety from fire. Local jurisdictions have failed to provide the traveler with this assurance.

This obligation of the hotel operator to provide for the safety of their guest does not in any way relieve the local jurisdiction from constantly updating their codes to provide the best codes that can be formulated. The authority elected, appointed and civil service in the Commonwealth of Puerto Rico failed to provide a code applicable to the hotels in Puerto Rico that would insure the safety of the tourist that patronize these hotels. There is not a hotel in Puerto Rico that can be considered fire safe by today's standards. Every hotel in Puerto Rico is a disaster waiting to happen. The fault lies with the codes in the Commonwealth of Puerto Rico. The Puerto Rico Planning Board last updated the code in 1968. The code as promulgated in 1968 was not adequate at the time of promulgation and has not been updated since. In comparison the New York City Building code which was also promulgated in 1968 and which was more comprehensive has been updated so many times that it is difficult to find a page of that code which has not been changed. In 1974 the College of Engineers and Surveyors of Puerto Rico undertook a six month study reviewing the Planning Regulation No 7, the building code of the Commonwealth of Puerto Rico, in order to bring this code up to date. Not one of their recommendations was ever acted on. A major responsibility for this fire disaster must rest with the Commonwealth of Puerto for their acts of omission.

There have been many hotel fires since 1968 that have cried out for the need to improve fire safety in hotels. Each one of these fire have taught many lessons. These fires are just to name a few are:

The Holiday Inn Greace N.Y. 10/26/78,
Holiday Inn Cambridge Ohio 7-31-79,
MGM Grand Las Vegas Nevada 11/21/80,
The Stouffers Inn in Harrison N. Y. 12/4/80,
The Hilton Hotel Las Vegas 2/10/81,
The Westchase Hilton Houston Texas 3/6/82,
Also fires in places of public assembly such as:
Beverly Hills Supper Club Southgate Ky. 5/28/77
Blue Angle Nite Club New York 2/24/76

These fires and many other fires throughout United States and throughout the world has caused every jurisdiction in the United States to examine and update their codes and pass what is commonly referred to as "Tombstone" legislation. But the authorities charged with the safety of the tourist in The Commonwealth of Puerto Rico failed to learn one lesson from all these fires. They had what is referred to as a "Concrete Mentality" in that they reasoned that the buildings were constructed of concrete so there was no need to take any further steps to insure fire safety in these hotels. They officials in Puerto Rico did not see any need to update their codes which were inadequate to start with. The failed to learn the simplest lessons from any of these disasters. They preferred to gamble with the lives of the tourist that patronized their hotels rather than provoke the hotel industry by formulating the necessary code changes required to provide a reasonable level of safety to the guest of these hotels. The code as promulgated in 1968 was in adequate and that code is still in effect today. It has never been upgraded. The hotel lobby in Puerto Rico is already reacting to the suggestion that the code in Puerto Rico require sprinklers in all hotels. The hotel lobby is stating that the economic hardship of installing sprinklers will force them to close. I suggest that if they can not provide adequate fire safety systems, they should close.

To demonstrate some of the inadequacies of the Building Code in effect in the Commonwealth of Puerto Rico the following excerpts are quoted.:

TYPE OF CONSTRUCTION

TYPE I FIREPROOF
& SEMI-FIREPROOF

PARTITIONS:
INTERIOR NON-BEARING TITLE II-O
TITLE II-O
ARTICLE II-O-1.0
II-O-O WALLS & PARTITIONS:

1. b. The erection of temporary partitions of wood, glass and other approved materials within rooms & spaces, not exceeding 5,000 square feet in area, occupied by a single tenant, is permitted.

### ARTICLE II-P-3.0:

### CEILING AND INTERIOR WALL FINISH

1. In buildings of Type I and II Construction, the combustible material used for ceiling and interior finish of walls, or acoustical covering shall not exceed one inch in thickness.

### ARTICLE II-D-4.0:

### WALL AND CEILING FINISH

In public buildings, institution buildings, or in those used for meetings, and their means of exit, no combustible material will be used on the inner wall and ceiling of a nature that the flame propagates on its surface faster than on a wood board of one inch (nominal thickness) covered with ordinary paint or varnish.

FLAME SPREAD OF MATERIALS

| | | | |
|---|---|---|---|
| CONCRETE | 0 | GYPSUM | 10 - 25 |
| OAK | 100 | SOUTHERN PINE | 130 - 190 |
| PLYWOOD | 75 - 275 | CARPETING | 10 - 600 |

The control of interior finish is important for the following reasons:

INTERIOR FINISH
AFFECTS A FIRE IN
FOUR WAYS

1. It affects the rate of fire buildup to a flashover condition.

2. It contributes to fire extension by flame spread over its surface.

3. It adds to the intensity of the fire by contributing additional fuel.

4. It produces smoke and toxic gases that can contribute to life hazard and property damage.

NOTE: Flame spread of interior finish is evaluated by the following test:

STERNER TUNNEL TEST
ASTM E 84
NFPA 255
UL 723

DEFICIENCIES FOUND IN HOTELS IN THE COMMONWEALTH OF PUERTO RICO

1. No sprinkler systems.
2. No smoke detectors.
3. No fire alarms.
4. No public address systems.
5. No fire safety plans.
6. No evacuation plans.
7. No evacuation organization.
8. No fire brigade organization.
9. No emergency planning.
10. No fire drills.
11. No established procedure for transmitting the alarm of fire to the Fire Department.
12. No fire safety directors.
13. No hotel staff emergency training.
14. No hotel staff emergency organization.
12. No signs at elevators.
13. No smoke detectors in HVAC system.
14. No compartmentation.
15. Extensive us of wood for interior partitions and interior finish.
16. Extensive use of combustible interior finish.

17. Unprotected vertical openings.
18. No smoke barriers.
19. Extensive use of live Christmas trees in hotel lobbies and places of public assembly.
20. No self-closing devices on guest room doors.
21. No fire rated doors on guest rooms.
22. Doors missing on fire stairs.
23. No door latches on fire stair doors.
24. Failure of fire stair doors to close completely.
25. Use of guest rooms to store combustibles.
26. Use of open access stairs to connect guest room floors.
28. Deterioration of standpipe hose.
29. Access to the fire stairs through an area used by the hotel for support services such as service elevator lobbies.
30. Failure of fire stairs to provide direct access to the exterior of the building.

In Conclusion I will leave you with the following though.

THERE IS

NO MATRIX

NO ALTERNATIVE

NO TRADE OFF

NO GIMMICK

THAT SATISFIES THE NEED

FOR A SPRINKLER SYSTEM

IN A HIGH-RISE HOTEL

DON'T LET ANY SPECIAL INTEREST TELL YOU OTHERWISE.

Mr. WALGREN. Thank you, Mr. Chapman. That's a powerful statement and one that deserves a period after it and probably a good deal of silence on our part.

I'm still confused about one thing in my mind. Mr. Gunter, you indicated in your statement that the NFPA Code does not require sprinklers in hotels, and the Life Safety Code, NFPA, does not mandate automatic sprinklers in new or existing, and I thought they indicated that they did in new.

Is that your impression?

Mr. GUNTER. That is my impression.

Mr. DeWar, you may want to clarify that.

Mr. DEWAR. If I may go a little bit farther, in places of public assembly, they do require sprinkler systems in new facilities. But as far as a structure, a highrise tower, there are no specific sprinkler requirements in guest rooms, in guest room corridors, in hotels.

Mr. WALGREN. Even in new ones?

Mr. DEWAR. Even in new ones. Basically what it says is, if you install a sprinkler system, it must comply with another NFPA Standard, NFPA 13, but there are no mandatory requirements for sprinkler systems.

There is an additional concern also. There are provisions for waivers for many of the requirements in the codes, and very commonly we will use a sprinkler requirement to offset travel distance to corridors, flame spread requirements. In some cases, local jurisdictions will do the reverse. They'll delete any sprinkler requirements in places of public assembly, because they have smoke detectors or because they seem to have additional egress doors, exit doors.

Mr. WALGREN. So you would agree with Mr. Chapman that there are perhaps some tradeoffs for some other elements of fire safety, but there is no tradeoff for sprinklers?

Mr. DEWAR. There is no tradeoff for sprinklers.

Mr. WALGREN. You are obviously in agreement with that, Mr. Gunter, as well?

Mr. GUNTER. I certainly am, Mr. Chairman.

Mr. WALGREN. Well, the Chair recognizes Mr. Boehlert.

Mr. BOEHLERT. Mr. Scarff, talk about the cost, if you will, a little bit of installing sprinklers in new hotels, the cost of retrofitting, and of the savings you've realized in insurance premiums.

Mr. SCARFF. Well, let's address the new construction to start with. These figures are—I probably budget in new construction—and I've got several billions of dollars of new construction underway at this time—I'm budgeting somewhere in the area of a dollar to $1.10 a square foot. I'm buying those sprinkler systems in the area of 95 cents a square foot.

When I'm putting a budget together, we're $1.10, $1.15, but for the most part, I'm buying sprinkler protection, entire sprinkler protection for a building, including underground and all the risers and all the piping, the total building per NFPA-13, is being bought for somewhere in the area of 92, 93 cents a square foot.

Mr. BOEHLERT. What would it cost you to carpet those new buildings, as Mr. Chapman——

Mr. Scarff. Wait a minute, sir. You're asking me—I'm not an interior designer. I only handle fire protection.

Mr. Boehlert. You know, carpeting costs more than that.

Mr. Scarff. I would assume so. I really don't have the figures on carpeting.

Mr. Boehlert. I understand. But I think that—Mr. Chapman, I really appreciated your very graphic description of things. It really helps us put things in perspective.

How about retrofitting now?

Mr. Scarff. OK, in retrofit, the way we determine the retrofit costs, we go back into a building, take an existing building and go back into it, take the total cost of the building and divide by the number of rooms. We walk out of that building with a totally sprinklered building per the codes. It's totally sprinklered. There's no shortcuts. We sprinkler the building; we use plastic pipe in the corridors and in the guest rooms themselves. And in many areas, we use it above the ceiling in public space.

I'm sprinklering a total hotel for somewhere in the area of between $1100 and $1200 a room. If I take a 300-room hotel, I'm talking about $360,000 to sprinkler it totally. That's walking out of the building—and that includes a soffit. I don't think you saw the slides, but we enclose the pipe in the corridors with a soffit, a drywall soffit, to make the building—to make it please the interior designers.

Mr. Boehlert. What has been the corporation's experience with its insurance premiums?

Mr. Scarff. I don't have those figures at hand. We have had not a substantial reduction in insurance premiums, because we've had a very good—we've had very good fire experience, because my corporation has had a good record for a long period of time.

I do know that some other people are saying that you could probably pay for a sprinkler system in three or four years. If you install a sprinkler system, your savings in insurance savings would probably pay for the system in three to four years. It may go as high as five, but you can amortize a system in five——

Mr. Boehlert. It's short-term.

Mr. Scarff. Very short-term; yes, sir.

Mr. Boehlert. Mr. Gunter, what's the magic you worked in Florida? How did you build this coalition of support within the industry, and did you have to make any concessions—well, that's probably an unfair question—to get their support?

Mr. Gunter. Congressman, we began that process with a very thorough survey of where we were in the State of Florida as to fire safety code discrepancies and just the overall problem as it was faced, as we saw it.

As you are well aware, Florida is a tourism state, and the thing that has occurred to me, as I have listened to the testimony and listened to your questions this morning, is that if it can be done in Florida, I think it can be nationally. I think it can be done anywhere, because we obviously have to have our hotels and motels in order to provide the facilities for a great tourism industry there in the state.

And yet we were able to, because we were able to put out on the table the critical nature of the problem and certainly the record of fire deaths and injuries and property damage and also the aspect of savings and insurance, that we built that coalition.

I'm not saying it was easy; it was difficult. I'm not saying that there wasn't a little blood on the floor; there certainly was in the whole process, and some give-and-take, and the industry itself was very concerned about the strong enforcement of the other fire safety requirements.

Testimony not just from me but from others here today has indicated that if you had automatic sprinklers, then that mitigates some of the other requirements that are often in the standards. And so we established this uniform procedure after sprinklering, wherein the hotel and motel owners would not be caught in the vise where they had to comply with all of the rest, if they had gone ahead with the more costly automatic sprinkler installations.

Mr. BOEHLERT. All of you are saying the same thing to us, I think, at least I'm hearing you, that you would like some sort of national legislation, federal legislation. Am I correct, Mr. Gunter?

Mr. GUNTER. That is correct.

Mr. BOEHLERT. Mr. Scarff, can you speak to that issue? It wouldn't impact on you; you're already ahead of the game.

Mr. SCARFF. Yes, I'm about 90 percent; 90 to 92 percent of all our hotel rooms are totally sprinklered, and of course, within the next year or two we will be 100 percent. So it will not impact on me. I can only speak for the Marriott Corporation; I can't speak for the industry.

Mr. BOEHLERT. Mr. Chapman, you were very eloquent and very strong in your plea for a national legislation.

Mr. CHAPMAN. I think so, and I think, I hope we will overcome the legality, the Interstate Commerce Commission, for the interstate commerce that the hotel industry is engaged in.

Mr. BOEHLERT. How do we enforce it if we do it? I'm intrigued by the prospect. All right, we put the law——

Mr. CHAPMAN. I know with the Fire Chiefs in general throughout the United States, if they are given the laws to enforce and, of course, the training that is being done by the National Fire Academy, I don't think you'll have that much problem with enforcement.

Another area of enforcement that I skipped over is the insurance industry. I've taken a piece out of everybody else today, I might as well get in on them. But the insurance industry is a State-regulated agency, and you can always find somebody that will insure a premise. The insurance industry, actually if you analyze it—and I worked years ago with the Rand Corporation and we analyzed the insurance—actually, the larger the fire losses, the more the insurance industry makes.

The insurance industry is only allowed by code in New York State anyway to make 10 percent of their gross handle. Their gross handle is determined by their premiums. Their premiums are determined by their losses for last year. So if I can increase the losses, I can raise my premiums, I can raise my gross handle and my 10 percent take goes up. So there's need, also, to put some type of a cap or to control the insurance industry, so that premises like we had here in Puerto Rico would not be able to obtain their insurance. If they couldn't obtain insurance they can't stay in business, so they would have to upgrade their premises.

So there's another means that we can use to bring the hotel industry up to where it should be.

Mr. **Boehlert**. Thank you very much, I have no further questions.

Mr. **Walgren**. Thank you, Mr. Boehlert. Well, I really feel that you've been a great panel and contributed wonderfully to the view of this from the public standpoint. And we certainly want to work with the thoughts and inspiration that you've given us. You have each, in your own way, set a tremendous example, and we hope that we can bring this situation along so that the federal government is not one that is not contributing, and can make some kind of very concrete step forward.

I couldn't help but remember in the back of this report, America Burning, most have seen the picture of the little girl that is in there, and it's on page 153; one of the toughest pictures you could look at. Each of you has, I know, experienced perhaps in the real world—Mr. Chapman in particular—such difficult circumstances. And certainly, we ought to be able to figure out how to push ourselves to lessen the frequency of that in our society.

So on behalf of all of us, thank you very much.

[Whereupon, at 1:45 p.m. the subcommittee meeting was adjourned.]

# APPENDIX I

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Bureau of Standards**
Gaithersburg Maryland 20899

May 6, 1987

Honorable Doug Walgren
Chairman, Subcommittee on Science,
 Research and Technology
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The report to Governor Colon of Puerto Rico by his appointed Commission on Fire Safety, of which I was a member, was released recently. The report was given to Governor Colon on April 8, 1987 and implementation of many of the Commission's recommendations is already underway.

The Governor appointed the Commission on Fire Safety following the disastrous fire in the Dupont Plaza Hotel in San Juan on New Year's Eve, 1986. The Commission's charter was to review the operational systems of the fire service and to review the conditions and regulations that pertain to fire safety in sensitive life safety occupancies.

The report is written for Puerto Rico, however, I believe that many of the findings and recommendations in the report are broadly applicable.

A copy of the report is attached for the Subcommittee records as we discussed following your hearing on hotel fire safety on March 5, 1987.

Sincerely,

Jack E. Snell, Director
Center for Fire Research

Enclosure

# THE COMMISSION ON
# FIRE SAFETY REPORT
## TO THE GOVERNOR

COMMONWEALTH OF PUERTO RICO
MARCH 1987

## COMMISSION ON FIRE SAFETY

Transmittal Letter

Executive Summary

Introduction

Recommendations and Findings:

- I. Improve Public Fire Safety Education and Awareness
- II. Implement Immediate and Retrofit Fire Safety Measures
- III. Revise Building and Fire Safety Laws, Codes and Regulations
- IV. Revitalize the Fire Service

Acknowledgments

Appendices

1. Executive Order No. 4844 - Commission on Fire Safety
2. Members of the Commission on Fire Safety
3. Senate Joint Resolution 1733 of 1987 - Appropriation for Fire Service
4. House Bill 1011 - Amendment to the Act of the Fire Service of Puerto Rico to Extend the Faculties and Powers of the Fire Chief
5. House Bill 1012 - An Act to Order the Installation of Sprinklers and Smoke Detectors in Hotels and Other Buildings
6. Persons Interviewed and Organizations Represented
7. Listing of Materials Received and Reviewed by the Commission
8. Fire Safety Actions Suggested to Tourism Company and Hotel Association for Immediate Implementation
9. Insurance Rate Credits for Fire Sprinkler Systems Inquiry and Response
10. Fire Service Officers - Experience
11. Fire Service Information Requested and Response Received

April 8, 1987

The Honorable Rafael Hernández Colón
Governor Commonwealth of Puerto Rico
La Fortaleza
San Juan, Puerto Rico

Dear Governor Hernández Colón:

On New Year's Eve of 1986, Puerto Rico experienced its greatest fire tragedy when at the Dupont Plaza Hotel fire claimed the lives of many and physically and mentally scarred the lives of others that survived.

In the days immediately following, you as Governor initiated several actions designed to alleviate the recurrence of such a tragedy and to address appropriate remedial and future directions for fire safety and fire defenses in the Commonwealth.

By Executive Order 4844, dated January 13, 1987, you created and appointed the Commission on Fire Safety with the assigned charter to review the operational systems of the Fire Service and to review the conditions and regulations that pertain to fire safety in sensitive life safety occupancies.

The Commission conducted its activities through research and review of applicable documents, interviews of public and private sector officials, observations and tours of representative occupancies and Fire Service facilities and the utilization of the expertise that resides with the members of the Commission.

The recommendations and findings of the Commission are enclosed and hereby transmitted to you.

While the Commission recognizes that the ultimate disposition of the recommendations will be appropriately subject to administrative and legislative processes, it is the Commission's collective message that the ninety-six victims of the Dupont Plaza Hotel fire shall not have died in vain and the lessons that have been reinforced must be shared with all those concerned and responsible for life safety from the consequences of fire. It is a worthy legacy to instill an attitude and acceptance of responsibility towards fire safety. Puerto Rico has the ability to fulfill its leadership role with reasonable commitment and investment.

The members of the Commission thank you for the honor and privilege that you have accorded us in service to the citizens and guests of Puerto Rico, by assisting you in addressing these critical issues.

In closing, we submit that elected and appointed officials have no greater obligation, no greater commitment than the protection of the lives and property of the citizens they serve and corporate and private citizens must extend this obligation and commitment to each other in their relationships.

For the Commission,

Respectfully,

Raul Gandara
Co-Chairman

Clyde A. Bragdon, Jr.
Co-Chairman

*This report is based on information received by the Commission between January 13 and February 27, 1987, from a number of Government officials, members and directors of professional associations and others, and from personal observations.*

*It should be recognized that from the moment this report is handed to the Honorable Governor of Puerto Rico some legislative and administrative measures are being taken.*

## I. EXECUTIVE SUMMARY

Initial reaction of many to the Dupont Plaza Hotel fire of December 31, 1986, was shock and disbelief. How could nearly one hundred (100) persons be overcome so quickly in an "apparently safe" concrete structure? After all, "..Puerto Rico had never suffered a hotel fire before.." Now, just over two months later, media attention has long since shifted elsewhere and this seemingly "..isolated event" appears to have been forgotten by the traveling public. Was this really an isolated event? Is there any reason to believe there could be a repetition? What steps should be taken to assure the people of Puerto Rico and the traveling public fire safety at reasonable cost? These are among the questions addressed by the Commission on Fire Safety, appointed by Governor Rafael Hernández Colón in its deliberations. The Commission met for four weeks. In that time, interviews were held with many public and private sector officials, and a number of buildings of various types were visited including the charred Dupont Plaza Hotel.

The people of Puerto Rico should know the alarming facts that have become abundantly clear to the Commission and understand the implications of these facts as well as the importance of the Commission's recommendations. The following points are basic to the breakdown in fire defenses and life safety in the Commonwealth, and important bases for the Commission's recommendations:

- The Fire Service has been on the decline for a number of years. Failure to adequately fund and manage this vital function of government finds the department in 1987 inadequate to fulfill its basic functions of prevention and suppression.

- It must be emphasized that fire prevention is the most essential ingredient of fire protection. However, a number of persons the Commission interviewed expressed the mistaken belief that concrete buildings are fire proof and further considerations of fire safety measures are unnecessary.

- Normally, model codes and standards represent "minimum" levels of fire protection. In many instances it is preferable to be exemplary, particularly in highly competitive markets such as tourism. Also, model codes may not reflect conditions unique to Puerto Rico. Further, typically model codes and standards lag the state-of-the-art by a number of years and therefore do not always represent the latest or most economical technologies or practices for fire protection. For these reasons, the services of code and fire protection engineering firms are essential to design and implement many of the detailed recommendations.

- The phrase "hotels, and other high risk residential and public assembly occupancies" is used consistently in a number of the recommendations. The intent is to delineate those buildings or occupancies which present a high potential for loss of life in case of fire. The Commission believes that in addition to hotels, most multi-family residential, particularly high-rise, and public assembly occupancies, should be included in this definition. An important task facing the Government of Puerto Rico in implementing these recommendations is to develop its own detailed list of such occupancies. This, of course, is a political decision that must reflect reasonable trade-offs among fire risk and potential loss of life, construction practices, living conditions, and costs.

- Inspection programs are inadequate. This condition is not unique to Puerto Rico. However, compliance with even the out-dated codes in existence is largely self-enforcing, leaving buildings and their occupants exposed to a multitude of hazards. Self-certification of plans, construction, etc. is not practiced widely elsewhere. Progressive fire departments should devote a major share of their efforts to fire prevention, including fire safety inspection.

- Fire safety education and awareness efforts are virtually non-existent. This has resulted in widespread lack of knowledge of fire risks and elementary concepts of fire prevention. There is an alarming lack of motivation for or attention to fire safety in the Commonwealth.

Our intent is to convey a clear sense of urgency to the Government to appeal to all segments of the society to join together to protect and defend the position as a major tourist attraction and retirement center in the Caribbean region. The Commission recommendations are intended to meet the challenge of enabling Puerto Rico to achieve a reasonable level of fire safety. The opportunity for a renaissance of the Fire Service of Puerto Rico is at hand.

The Commission has addressed the issues that emerged as most crucial and pressing during the limited period of its deliberations. Therefore, these recommendations and findings should be considered only as the essential first steps for Puerto Rico. Undoubtedly, as these issues are addressed in the coming weeks and months, other problems will be identified that we missed or overlooked. Some provision for such unexpected needs should be considered in allocating and organizing resources to meet Puerto Rico's fire safety needs.

The Commission findings are most likely not unique to Puerto Rico. Many of the conditions observed here are known to exist elsewhere. The Commission commends the Governor of the Commonwealth for his willingness to share these findings and recommendations, and challenges readers outside of Puerto Rico to consider their potential relevance lest they too come to learn these lessons by similar tragic circumstances.

## SUMMARY RECOMMENDATIONS AND SUMMARY FINDINGS

RECOMMENDATION 1: ***Improve public fire safety education and awareness.***

Although leadership responsibility here falls on the Fire Chief of the Fire Service of Puerto Rico, active support and assistance of leading public officials--from the Governor personally, on down--and private sector executives--particularly, of hotels, industry, and the media is needed. Immediate, near term and continuing activities are proposed for actions in hotels, schools, by the media and industry, and by the Fire Chief, the Governor, and other public officials.

FINDING: The first line of defense in fire safety is a public knowledgeable of the risks and hazards of fire. Among the most disturbing findings of the Commission has been the persistent, wide-spread and mistaken belief that concrete structures by themselves assure life safety from fire. Most frequently it is the contents, interior finishes, and processes within a structure that constitute the principal fire loading and not the structure itself. Building contents alone typically represent the major source or fuel for flames, heat, smoke, and toxic gases that threaten the lives of the occupants, and can by themselves lead to "flashover," i.e., **very rapid development** of total fire involvement leading to complete interior burn-out.

World leaders in fire safety education have identified other important themes. The fact is that fire safety awareness and education programs work well to influence public attitudes only when they are aggressively supported by top management, government officials, industry leaders and media. Most of the measures suggested can be implemented at no or low cost and yet these measures may have impacts as significant as built-in fire protection.

* * *

RECOMMENDATION 2: ***Implement immediate and retrofit fire safety measures.***

The immediate measures urged by the Commission include prudent fire prevention and safety activities, and a fire sprinkler retrofit law that meets the intent of House Bill 1012 for hotels and other buildings in which the potential for loss of life is high.

FINDING: The critical issue of fire safety in existing buildings should be addressed without delay. Many years of neglect have resulted in serious fire safety deficiencies in a large number of buildings in the Commonwealth. The provisions of these recommendations will, in the opinion of the Commission, provide guidelines for reasonable levels of fire safety in existing buildings.

* * *

RECOMMENDATION 3: ***Revise building and fire safety laws, codes, and regulations.***

The Commission views installation of fire sprinkler systems as crucial to fire safety in new or renovated buildings. Major revision of fire protection requirements and the Building and Fire Codes of the Commonwealth based on applicable portions of model codes and standards are recommended, and in addition, the installation of fire sprinkler systems where not now stipulated. The Commission recommends significant changes in the fire prevention functions and staffing of the Administration for Regulations and Permits, and the Fire Service particularly in the areas of review of plans and specifications; and on-site, and in-service inspections. Additional recommendations here address needs for interagency coordination, and the costs of fire prevention services.

FINDING: The fire prevention statutes, codes and regulations are very much out of date and are practically unenforceable. The regulations and means for certification and inspection of construction projects are seriously flawed and outmoded. Self certification for construction projects is not sufficient to assure fire safety of buildings. The Commission is not aware of total reliance upon self certification in any state of the U.S. The crucial missing elements are review of plans and specifications, and on-site inspection by qualified reviewers and inspectors under the direction of fire protection engineers.

Also, the fire prevention programs are inadequate, poorly staffed and not supported. As a result of these conditions and the inadequate supply of trained Fire Service inspectors, serious fire safety deficiencies exist in many buildings in Puerto Rico. For example, during its proceedings, members of the Commission visited a number of buildings in the metropolitan areas of San Juan, Dorado and Ponce. These included hotels, restaurants, hospital, office, commercial and public assembly occupancies. Conditions of fire safety varied greatly among these buildings. Some, particularly a few buildings of recent construction, were adequate for the fire protection systems provided. However, many were substandard. Problems noted included absence of sprinklers except for kitchens or laundry facilities in commercial occupancies, residential occupancies typically do not have door closers; exit doors were found to operate in the wrong direction, blocked or chained shut; emergency lighting was limited even in public occupancies; and combustible finishes were found where such should be prohibited.

The proposed revisions would provide Puerto Rico with state-of-the-art fire safety regulations and would be vastly more efficient to enforce since these codes contain explicit references to nationally recognized standards and test methods and would be easier to maintain, since the nationally recognized model codes on which the revised regulations are based are updated regularly.

* * *

RECOMMENDATION 4: ***Revitalize the Fire Service.***

The essential functions of the modern Fire Service are fire prevention, including investigation of cause and origin, and suppression and rescue. Each of these involve important responsibilities for public information, budgeting, training, professional development and resource management.

The recommendations of the Commission in this area are based on proven practices and on nationally recognized standards, guidelines, and practices.

FINDING: The present organization of the Fire Service of Puerto Rico was sufficient and effective in the years following its creation. The Puerto Rico of today, with a great number of large industries, high rise residential, office, hotel, hospital and government buildings has and continues to change. The Puerto Rico of today needs a modern, professionalized Fire Service.

The Fire Service of Puerto Rico has serious deficiencies in leadership, organization, operations, planning, staffing, training, equipment, and facilities.

## INTRODUCTION

The tranquility and celebration of the holiday season was dramatically interrupted mid-afternoon on December 31, 1986, when fire ravaged portions of the Dupont Plaza Hotel in the Condado section of San Juan, Puerto Rico leaving ninety-six fatalities and scores injured and physically and mentally scarred. As the media unfolded the details of this tragic event throughout the world, the attention, reaction and inquiry that emerged was predictable. The questions demanded answers.

The authorities having jurisdiction have and are conducting an official investigation of the fire incident including alleged criminal activities. In order to reach beyond a typical reactive response the Governor of Puerto Rico, Rafael Hernández Colón promptly proposed strict new legislative measures to require the installation of fire detection and suppression systems, to increase the authority of the Fire Service and to provide additional funding for immediate fire service needs. Administratively, Governor Hernández Colón directed an implementation of an Inspection Plan of high risk buildings, including the imposition of penalties for failure to correct deficiencies. He further directed the Regulations and Permits Administration to conduct a thorough revision of the Commonwealth Construction Code to ensure the most current standards of fire safety. (Appendices 3, 4 and 5.)

Additionally, the Governor by Executive Order 4844, dated January 13, 1987, created and appointed a Commission on Fire Safety. The Commission was directed to conduct a thorough review of the operational systems and practices of the Fire Service, including inspection procedures, to determine how they might be improved, and to conduct a thorough review of all conditions and regulations in effect that pertain to life safety in residential, office, and public assembly occupancies to determine how they might be improved to achieve in the shortest possible time the highest practical level of fire safety. (Appendices 1 and 2.)

Both reviews ordered in the foregoing were to be made with a view to recommending improvements that will enable Puerto Rico to achieve a leadership role in fire safety at a reasonable cost.

The Commission interviewed representatives of a number of Agencies of the Government of Puerto Rico and of the relevant private sector organizations. (Appendix 6.)

The Commission toured the Dupont Plaza Hotel and visited several typical buildings of the occupancy classifications of concern in the Metropolitan San Juan area, Dorado and Ponce. Fire Service facilities were also visited. The Commission studied and analyzed existing building and fire codes, not only of the Commonwealth of Puerto Rico, but also model codes and specific amendments by some states relative to the issues being examined. An investigation and analysis has been conducted of the procedures followed by the government agencies that control construction and of the operational procedures of the Fire Service.

In short, the Commission considers that its concentrated procedures and efforts have placed it in a position to make those recommendations that should improve the situations and conditions found and ensure the highest practical level of fire safety. In this regard, the Commission was sensitive to costs in its deliberations and acknowledges that excessive expenditures do not necessarily assure the ultimate goal of obtaining the most practical levels of fire safety.

Based on the charge to the Commission, we submit our report with its recommendations and findings divided into the following categories:

I. Improve public fire safety education and awareness

II. Implement immediate and retrofit fire safety measures

III. Revise building and fire safety laws, codes and regulations

IV. Revitalize the Fire Service

The report represents a consensus of the Commission who collectively urge timely consideration and planned implementation of its recommendations as being in compliance with the mandate set forth by Governor Hernández Colón and as being in the best interests of the citizens and guests of Puerto Rico.

RECOMMENDATIONS AND FINDINGS:

## I. IMPROVE PUBLIC FIRE SAFETY EDUCATION AND AWARENESS

RECOMMENDATION I.-1 ***Hotels in consultation and collaboration with the Fire Service should establish vigorous programs of fire safety education and awareness.***

For example:

- Fire Safety Seminars for managers and staff.
- Materials for guests; training of staff, check-in briefings, etc.
- Require management to make opening presentation at all meetings.
- Fire safety "tips" in "Que Pasa."

FINDING: The occupants and staff of the Dupont Plaza hotel apparently lacked basic knowledge about fire, fire prevention and preparation for a fire emergency. Similar conditions exist in many other hotels in Puerto Rico. Fire prevention and appropriate behaviors during a fire can and should be taught. The hotel staff must be trained to know what to do and be prepared to assist occupants/guests.

* * *

RECOMMENDATION I.-2: ***Media and industry with direction from the Fire Service should actively support fire and fire safety education and awareness.***

Typical activities could include:

- Financially support and lead "Governor's Fire Safety Council"--an ongoing group to direct the planning of Fire Safety Programs and events.
- Sponsor public fire safety knowledge/attitude survey--as basis for programs, procedures, and manuals tailored for Puerto Rico.
- Sponsor periodic fire safety columns, articles, cartoons in newspapers.

FINDING: Media reaction of hotel owners/managers to the Dupont Plaza hotel fire appeared to be one of entrenchment and resistance to the possibility of costly new fire safety measures rather than leadership and concern for the fire safety of employees and the traveling public. Media coverage of the fire and subsequent events was very good, however it focused mostly on the negative and criminal aspects of the tragedy. Little has appeared in the media about efforts to restore public trust and confidence. Public awareness and civic leadership go hand in hand in building confidence in hotel fire safety and in reducing risks of fire. Measures such as those outlined above represent an opportunity for hotel/media/industry leadership in restoring community trust.

* * *

RECOMMENDATION I.-3: ***Consider establishment of a fire science program developed cooperatively between the Fire Service and the University of Puerto Rico, development of a fire protection engineering curriculum at the University of Puerto Rico, and include an obligatory course in fire safety in the College of Engineering and the School of Architecture.***

FINDING: Modern fire protection practices build on understanding of fundamental principles and the accumulated experience of professionals. There is currently no capability in Puerto Rico for fulfilling this need. Increasingly, fire and building officials, officers and inspectors, as well as private sector architects, engineers and risk managers are turning to formal educational programs offered at the community college and university levels to provide the academic training needed to keep pace with developing fire protection technologies and practice.

* * *

RECOMMENDATION I.-4: ***The schools of Puerto Rico, under the leadership of the Fire Service should develop and implement fire safety education programs for the children of the Commonwealth.***

These programs may include:

- Development of teaching plans on fire safety in all schools, including demonstrated fire safety education programs such as the National Fire Protection Association's "Learn Not to Burn" program and including lectures from fire personnel officers, field trips to stations, and home fire prevention assignments.
- Sponsorship of fire safety promotional activities such as Fire Prevention Poster Contest, Miss Fire Safety Queen contest with pageant, parade, picnic, fire service demonstrations, etc.
- A revived "Careless Family Home" program and competition.

FINDING: Puerto Rico once had an enviable fire safety education program in the schools led by the Fire Service. That program has lapsed. Current efforts have little, if any, meaningful impact. Young children are good listeners and can effectively increase fire safety awareness of those around them. A vigorous fire safety education program can result in greatly reducing the number of fires and the magnitude of fire losses, and increase community pride.

* * *

RECOMMENDATION I.-5: ***A Fire Service School Education Unit be assigned exclusively to "special programs" for the children of Puerto Rico.***

FINDING: There is currently no such unit in the Fire Service. The opportunity for young persons to learn to do something constructive is ever present in the day to day operations of the Fire Service. Pride can be instilled in young persons to undergo training and become effective to the ultimate goal of reducing fire losses.

* * *

RECOMMENDATION I.-6: ***Fire Chief in collaboration with Governor's office and other public and private sector officials should commit to an aggressive fire safety campaign.***

Suggested activities include:

- Produce a TV/Video Documentary, "The Dupont Plaza Hotel Fire: Puerto Rico's Response."
- Prepare mandated Fire Chief's Annual Report to the Governor and Legislature and have reprinted and distributed to media, industry and the public.
- Prepare periodic TV spots by Governor on fire safety.
- Promote a voluntary home fire safety inspection program based, e.g., on the National Fire Protection Association's "E.D.I.T.H." (Exit Drills in the Home) program.
- Extend fire prevention week to fire prevention month with cooperation of Fire Service, Scouts, Civic Associations, etc.

FINDING: The actions taken immediately by the Governor in response to the Dupont Plaza hotel fire were positive. However, continued and institutionalized efforts will be needed to assure the public ultimately benefits from the lessons of this tragedy. The Fire Service is providing no measure of its performance to the people of Puerto Rico. This legislatively mandated function is an important element in the overall process of building public trust and confidence.

## II. IMPLEMENT IMMEDIATE AND RETROFIT FIRE SAFETY MEASURES

RECOMMENDATION II.-1: ***Immediate fire safety measures should be implemented by the hotels, and other high risk residential and public assembly occupancies to improve their fire safety. Individually and/or collectively, the responsible managements are encouraged to develop and implement a fire safety improvements program including fire safety guidelines, measures and practices, and checklists for continued monitoring. This program should be developed in consultation with fire safety professionals and coordinated with the Fire Service.***

FINDING: The Commission has reviewed a number of hotel fire safety inspection reports and, also, has visited a number of hotels and other high-risk and residential occupancies. A large number of serious fire hazards were observed. These include accumulated fire (fuel) loads, blocked exit ways, inadequate provision for egress, lack of smoke detectors, sprinklers, emergency lighting, door closers, non-functional or missing exit way doors, and the absence of many other fire protection measures that are appropriate and required. Many of these conditions are obvious violations of existing codes. Others are measures one would expect a good management should provide in addition to legal minimum fire safety requirements. These conditions suggest that the owners of hotels and other high-risk occupancies in Puerto Rico generally lack an understanding of fire risk and state-of-the-art fire protection technology. There are many things a building owner may do to reduce the risk of fire and the potential hazards of fire loss for little or no cost. For example:

- Implement a fire prevention awareness program for employees emphasizing elimination of bad fire hazards, unsafe practices, and do's and don'ts during fire emergencies.

- Provide selected employees with a fire prevention check list, to report all fire prevention violations and/or deficiencies in their area of responsibility. Develop and implement a daily self-inspection safety program by hotel management and maintain a daily log of same.

- Review and emphasize good housekeeping practices, e.g., no blocking of halls, stairs, doorways, storage of trash, combustibles.

- Prohibit smoking in all areas that store combustibles, i.e., linen closets, mattress storage, furniture storage, etc. Insure that all ashtrays used by guest and employees, in all public and private areas, are safety designated and made of non-combustible materials. Combination ash trays and waste disposal baskets to be prohibited. Remove all ash trays from inside elevator cars. Post "No Smoking" signs in all elevator cars.

- In each stairway, install floor level signs on all floors on stairway side. Install floor level signs at or in view of all elevator cars to indicate floor level to guest and emergency personnel.

- Insure that lighting in all public corridors, stairways, and exits are functioning properly: no missing bulbs, and open electrical connections.

- Require qualified fire safety guards during all public assemblages; the number depending on the size of the assembly, type of occupancy, and configuration of the assembly area.

- Install self-closing door closers on all doors, e.g., guest rooms, storage rooms, public assembly areas, mechanical and hazard areas, etc.

- Install single station smoke detectors in all guest rooms as a temporary measure until central station systems are provided.

- Institute a program of removing and prohibiting the use of flammable decorations in public areas. Require non-combustible and/or properly flame proofed materials.

* * *

RECOMMENDATION II.-2: ***Adopt a fire safety law for hotels, and other high risk residential and public assembly occupancies as generally outlined in House Bill 1012 which provides for the installation of total fire sprinkler systems for existing buildings. Such a requirement should be consistent with the recommended requirements for new construction and include provisions for specific engineered fire safety. Obtain the services of a code and fire protection engineering consulting organization and utilize as may be appropriate the provisions of the Uniform Fire Code and the National Fire Protection Association's Life Safety Code in the development of this fire safety law, including recognized standards for sprinkler design and installation.***

FINDING: Minimum fire safety requirements for high risk residential, and public assembly occupancy buildings have been increased significantly over recent years as a result of numerous tragic fires and improvements in fire protection technology. Conditions observed by the Commission in Puerto Rico fall well below the minimum levels of safety in widely accepted fire safety codes and standards. Immediate passage of a fire safety regulation for existing buildings is essential to reduce the risk to life safety by addressing the deficiencies that currently exist in hotel, assembly, and other high-risk occupancies in Puerto Rico. Sprinklers are increasingly being specified for these occupancies. For example, retroactive sprinkler laws are on the books in the states of Nevada, Florida, and Massachusetts and in many local jurisdictions within the continental United States. Considering that insurance rates may be substantially reduced, the investment can pay for itself. Credits of twenty (20) to sixty (60) percent on existing rates have been indicated. (Appendix 9.)

* * *

RECOMMENDATION II.-3: ***A system of regular inspections by trained Fire Service personnel with appropriate authority, using a modern fire prevention code, enforceable penalties for violations and backed up by legal assistance must supplement the original approval of the building and occupancy permits. Consider making completed inspection reports, or summaries thereof, publically available.***

FINDING: An obvious deficiency in the fire safety system of Puerto Rico became evident to the Commission very early in our deliberations. There is no systematic fire prevention program. A day-to-day fire prevention inspection program is an essential element for fire safety. Current Fire Service inspection capability is inadequate. Fire prevention inspectors are inadequately trained and do not have the authority or support needed to fulfill their responsibilities.

* * *

RECOMMENDATION II.-4: ***The Fire Service should conduct proper follow-up re-inspections of all hotels, and other high risk residential and public assembly occupancies to assure that deficiencies are addressed and that unsafe conditions are being removed.***

FINDING: Due to lack of adequate staff, follow-up re-inspections of properties found to have serious deficiencies have not been routinely performed by the Fire Service in recent years. The recently launched series of inspections of all hotels and high risk buildings of Puerto Rico should be followed up with re-inspections and, if necessary, enforcement actions to assure that essential corrections and modifications are made promptly. Guidelines for such inspections must be prepared and training provided with the assistance of a qualified fire protection engineer to assure that the inspectors have the resources needed to complete this important task.

* * *

RECOMMENDATION II.-5: ***The Chief of the Fire Service should designate a Fire Prevention Chief Officer to coordinate fire safety at hotels, and other high risk residential and public assembly occupancies.***

FINDING: No Chief Officer currently is exercising this responsibility. To facilitate timely implementation of fire safety measures in the hotels of Puerto Rico and assure maintenance of the confidence of the traveling public it is important to assign this responsibility to an official of the Fire Service with sufficient authority, experience, and rank.

In accomplishing the above we suggest this inspector have the following duties:

- Coordinate with management so as to name a fire safety director with specific responsibilities.
- Implement and approve a fire safety plan with the safety director and management.
- Inspect with chief of maintenance all safety equipment installed in the building. In case of deficiencies continue and follow-up until same are corrected.
- Coordinate with management and the fire safety director so as to provide occupants with information as to location of exits and the operation of the alarm system. Information as to what to do in case of fire could be displayed permanently on door of each occupant room.
- Implement with the fire safety director and management a written evacuation plan to provide proper education and procedures as to the orderly evacuation of occupants.
- Assist the fire safety director to organize a fire brigade. Members of the brigade should be qualified employees.
- Assist the fire safety director coordinating monthly fire drills for fire brigade.
- Appropriate records are to be maintained.

* * *

RECOMMENDATION II.-6: ***All hotels, and other high risk residential and public assembly occupancies should designate a management official as a Fire Safety Director, to be responsible for the building's fire safety plan, staff training, and occupant preparedness activities.***

FINDING: Fire safety appears to have low priority with the management of most hotels in Puerto Rico as evidenced by the conditions found in their buildings, the training and preparedness of staff, and information provided to guests. Fire safety requires the continuing attention of a high level management official and the commitment of the top management. This individual must work in cooperation with the Fire Service and periodically receive training and have preparedness reviewed by the Fire Service. The following duties of a fire safety director are suggested:

- Be responsible for the up to date availability of the fire brigade.
- Organize and plan the fire brigade.

- Be familiar with written overall fire safety plan.
- Notify management when a designated person on the fire brigade is neglecting his responsibilities within the fire safety plan.
- Define written duties of fire brigade.

## III. REVISE BUILDING AND FIRE SAFETY LAWS, CODES AND REGULATIONS

RECOMMENDATION III.-1: ***Revise the Commonwealth Building and Fire Safety Laws, Codes and Regulations by the adoption of current editions of model building and fire codes and an appropriate mechanism to maintain these codes to current standards. Additionally, utilize the means of "adopting by reference" those appropriate standards that support these codes such as the Uniform Fire Code Standards, the National Fire Protection Association's fire protection standards and the American Society for Testing and Materials' standards for materials and testing. Codes should include provisions for specific engineered fire safety. Obtain the services of a code and fire protection engineering consulting organization to assist in the development and upgrading of these building and fire safety laws.***

FINDING: Puerto Rico's building and fire codes are outdated and as such fail to recognize current technology. The building code reflects at least in part the Uniform Building Code of the 1960's. The sections addressing fire safety features are particularly out of date and incomplete. Similarly, the fire prevention code is outdated and incomplete. The vague language leaves the user and the enforcing authority in question concerning the actual requirements of the code.

Currently model building, fire, and life safety provisions are contained in the codes published by the International Council of Building Officials (ICBO)--the "Uniform" Codes; the Southern Building Code Congress (SBCCI)--the "Standard" Codes; and the Building Officials Council of America (BOCA)--the "BOCA" Codes. The National Fire Protection Association develops and publishes the National Fire Codes.

* * *

RECOMMENDATION III.-2: ***Prescribe mandatory use of automatic sprinklers in new construction and major renovations at a minimum in hotels, and other high risk residential and public assembly occupancies as well as those other occupancies prescribed in the model codes.***

FINDING: An automatic sprinkler would have prevented loss of life in the Dupont Plaza hotel fire. The Commission unanimously endorses the concept of automatic sprinkler systems as the most effective and reliable on-site fire protection available today. Determination of specific sprinkler requirements for various occupancies is a decision for the officials of Puerto Rico.

* * *

RECOMMENDATION III.-3: ***Consider the future adoption of fire sprinkler requirements for all new construction and remodeling of buildings over five thousand (5,000) square feet.***

FINDING: There is a growing trend to require fire sprinkler systems for all buildings over either 5,000 or 10,000 square feet as part of a community fire protection master plan that will ultimately reduce the level and cost of public fire protection.

* * *

RECOMMENDATION III.-4: ***Withdraw legislative proposal HB 1011, which addresses the powers and authority of the Fire Service, and reevaluate/redraft to make proposed changes consistent with those cited in the Uniform Fire Code.***

FINDING: Proposal HB 1011 would confer extraordinary, and unwarranted powers to the Chief of the Fire Service imbalancing the relationship between administrative and judicial authority. Article II of the Uniform Fire Code addresses powers and authorities of the Fire Service. If this code or a similar code is to be adopted as recommended by the Commission the proposed legislation should be consistent with its provisions.

* * *

RECOMMENDATION III.-5: ***Review and adopt provisions of the Uniform Building Security Code as may be applicable to the Commonwealth.***

FINDING: The increasing problems with security concerns has caused an inordinate reaction that literally imprisons citizens and guests in their residential environments through the use of barred windows and doors and other security devices. This presents an unacceptable life safety hazard from fire. The Uniform Building Security Code addresses these concerns between life safety and security.

* * *

RECOMMENDATION III.-6: ***Consideration must be given to authorize and empower firefighters and fire inspectors with limited peace officer status which would enable them to issue citations for fire code violations. The Fire Service should have appropriate legal support staff similar to other agencies such as Administration for Regulations and Permits and the Planning Board to support enforcement of issued citations.***

FINDING: The fire prevention inspectors are totally frustrated in their attempts to gain compliance to laws when that compliance is not cooperatively or voluntarily given. The inspectors are not logistically or legally supported. They are required to provide most of their own clerical support in an antiquated inspection reporting and records system rather than being supported by appropriate clerical staff so the inspector's time can be utilized more productively. The inspectors receive little to no support from qualified legal staff so their success record in judicial proceedings is negligible. The ability to issue citations will enhance compliance with code violations that should be corrected immediately because of the level of risk involved.

* * *

RECOMMENDATION III.-7: ***The regulation, inspection and control of the storage, use and handling of explosive, flammable, or combustible substances and all other hazardous gaseous materials such as Liquid Petroleum Gas, should be performed by the Fire Service.***

FINDING: The present practices and procedures observed by the regulatory authority, the Commission for Public Service, do not appear to effectively regulate and control the transportation, storage and use of these hazardous substances. The Commission for Public Service is understaffed and unable to fulfill their legal obligations. Effective regulatory and preventive practices are not being observed. The use of illegal Liquified Petroleum Gas cylinders has become a serious problem in Puerto Rico. Modern fire codes place the responsibility to regulate and control the aforementioned hazardous substances with the Fire Service.

* * *

RECOMMENDATION III.-8: ***Establish an effective fire prevention, inspection, and enforcement program.***

Recommended at a minimum the following specialized units be established, adequately staffed and supervised with the frequency of inspections and follow-up commensurate with the level of risk.

- A residential and public assembly inspection unit, i.e., hotels, condominiums, high risk, etc.
- A commercial building inspection unit, i.e., office, factory, warehouse, stores, etc.
- An institutions inspection unit, i.e., hospitals, health care facilities, schools, custodial facilities, etc.
- A plans review unit supervised by qualified fire protection engineers to review all plans submitted for endorsement to ensure full compliance with the applicable provisions of the Building Code and Fire Prevention Code.
- A hazardous materials inspection unit to include chemicals and flammable liquids and gases.
- A legal and technical unit with qualified attorneys to assist in the preparation, presentation and testimony of legal matters before the Courts for the enforcement of the codes, laws and regulations and for the monitoring, updating and interpretation of the same.
- An education and public information unit to promote fire safety and prevention consciousness using public and private sector

channels; news media, both print and electronic, fire prevention campaigns and contests.

- A school education unit as stated in Recommendation I-5.
- Area inspection units to provide and coordinate general inspection activity for the requirements not included in the specialized inspection units and utilizing the fire suppression personnel as an assisting inspection resource.

FINDING: The fire prevention responsibilities are of sufficient magnitude to require specialization in inspection activities which would increase proficiency, standardization, and continuity. Fire prevention must be recognized as the first and most important step in fire protection. Cyclical inspections must be made, reinspections of violations made to ensure correction, and enforcement of fire prevention laws must be firmly administered.

* * *

RECOMMENDATION III.-9: ***Develop and implement a self fire prevention inspection system to increase awareness, responsibility and participation by building owners and managers and to assist fire service inspection personnel as a preliminary inspection.***

FINDING: There is no evidence of self-inspection guidelines and procedures being utilized or contemplated. Self-inspection guidelines and procedures properly designed for the specific occupancy classification can be mailed with instructions for completion and compliance by a date certain on which an inspection follow-up would be scheduled by fire service inspectors. Such an advanced system has the potential of increasing fire safety awareness, voluntary compliance through participation and reduction of inspector's time and follow-up thus increasing productivity. It can create a greater partnership in addressing fire safety issues.

* * *

RECOMMENDATION III.-10: ***Establish a fire company in-service field inspection program.***

- Fire Prevention inspections and/or reinspections could be enhanced by a practice of having them performed by teams of on-duty firefighters under the supervision of a Company Officer. The benefits of such a program are manifold: safety is improved, violations are noted and corrective actions taken, and the firefighters gain familiarization with the buildings.
- Companies should maintain records, in the firehouse, of all buildings in their administrative districts, and records maintained of all inspections conducted and of re-inspection results of violations cited.

FINDING: The Commission found the fire prevention activities of the Fire Service deficient, and the resources of the fire suppression division not utilized.

* * *

RECOMMENDATION III.-11: ***Law enforcement and other public officers that interface and interact with the public and public buildings should receive training in first-aid fire suppression and basic fire prevention laws.***

FINDING: There is an exceptionally large resource in the police and other public officers that can serve as prevention officers with minimum interference with their regularly assigned duties, i.e., the recognition of a threatening fire hazard that demands immediate correction or notification and the use of first aid fire equipment such as extinguishers that should be standard equipment in all patrol vehicles.

* * *

RECOMMENDATION III.-12: ***The Administration for Regulations and Permits should maintain the capability and expertise to review all plans and specifications for code compliance including, in particular, analysis of the appropriateness of exceptions or the equivalence of alternative designs or systems.***

FINDING: The total reliance of Administration for Regulations and Permits on self-certification of plans and specifications by submitters is not in the best interests of fire and life safety. However, procedures should be adopted which encourage quantitative analysis of fire hazard and sound engineering by submitters of plans. Therefore plan review by the Administration for Regulations and Permits is recommended as a complement to rather than a replacement for designer self-certification. A method of checks and balances is essential to assure compliance with the levels of safety set by the Commonwealth.

* * *

RECOMMENDATION III.-13: ***All plans and specifications should be reviewed for compliance with fire safety requirements by qualified personnel under the supervision of a fire protection engineer.***

FINDING: In the present plans review and permit process plans are sent to the Fire Service for a fire safety endorsement. There they are checked by the Fire Service plans examiner. The Commission seriously questions the quality of this vital segment of the plans review process. Our concern is in two areas: the lack of professional qualifications of the Fire Service examiner; the ability of a one-person operation to adequately fulfill this important function.

* * *

RECOMMENDATION III.-14: ***On-site inspections of construction for code compliance should be performed by the Administration for Regulation and Permits inspectors. Tests of the performance of fire protection systems should be conducted by inspectors from the Fire Service on completion of construction and prior to issuance of permit for occupancy.***

FINDING: As far as the Commission can determine, there is no assurance other than the certificate filed by a contractor that installed fire protection systems/measures are functional before an occupancy certificate is issued. Again, the issue is checks and balances. On-site inspections of buildings during construction by Administration for Regulations and Permits and the fire inspector is essential for reasonable code compliance. The Commission is of the opinion that total reliance on self-certification inspections is not adequate. The Commission is fully aware that current staffing is inadequate and that qualified personnel must be provided to fulfill even the basic recommendations for plans review and on-site inspection during construction.

* * *

RECOMMENDATION III.-15: . ***Establish a standing board involving representation from the Planning Board, Administration for Regulations and Permits, College of Engineers and Surveyors, College of Architects, the Fire Service and other private sector interests to act as an advisory body on building code and fire code development and implementation and serve in the role of an administrative appeals board for code compliance and variance.***

FINDING: There is little, if any effective coordination of fire safety requirements and systems among various agencies of the Commonwealth. The Commission calls upon the Planning Board, Administration for Regulations and Permits, College of Engineers and Surveyors, College of Architects, and the Fire Service to bring their collective talents together in a cooperative effort to assist the Commonwealth in overhauling and implementing a modern building code and fire code system. These organizations working in harmony can make a major contribution to this effort.

* * *

RECOMMENDATION III.-16: ***Establish a long range planning effort for community fire protection and other emergency service needs to advise the Planning Board and other concerned public officials regarding land use and development.***

FINDING: There is no system for meeting future fire protection or other emergency service needs. Puerto Rico will undoubtedly experience continued growth. Systematic planning to provide the appropriate mitigation and emergency services required must begin immediately. All agencies that impact such a planning effort should participate in a comprehensive five to ten year plan that would provide for continuous upgrading and monitoring.

* * *

RECOMMENDATION III.-17: ***Develop and implement a "one stop" permit and plan checking process to better serve the development and construction industry and the public.***

FINDING: The process of obtaining plan and endorsement approval and permits is cumbersome, time consuming and frequently frustrating therefore creating an additional expense to the industry and citizen. A "one stop" process can be accomplished by common physical locations and specific schedules of approval, endorsement and permit agencies both in the urban and rural situations. Such systems work effectively, particularly for the less complicated or extensive plans and approvals.

* * *

RECOMMENDATION III.-18: ***Consider a system of fees for plan review, permits and inspections to fully or partially offset the costs of building and fire code enforcement.***

FINDING: Inspections and reviews of plans and specifications is a direct service to the owner/operator of the specific properties involved, and as the recipient of the service they should share in the cost.

* * *

RECOMMENDATION III.-19: ***Consider the adoption of a provision to waive the increase in assessed valuation for property taxation purposes the increase in value resulting from the installation of approved fire protection systems.***

FINDING: Building owners fear that fire safety improvements will not only require them to make initial investments, but also increase their taxes through increased assessments. The installation of approved fire protection systems in building and the appropriate maintenance of these systems greatly reduce the opportunity for and the magnitude of fire. Over the term, these systems reduce the demand and costs of public fire protection. It therefore provides a balance for the building owner to be relieved of an additional tax burden through the provision of built in fire protection systems. The States of Alaska and California have applied variations of this property tax relief.

## IV. REVITALIZE THE FIRE SERVICE

RECOMMENDATION IV.-1: ***Revitalize and restructure the Fire Service utilizing the services of a professional management organization experienced in working with fire service organizations as a consultant.***

FINDING: A master plan is indispensable. The Commission reviewed the operational systems and practices of the Fire Service of Puerto Rico, including but not limited to its inspectional procedures and practices. In carrying out the Governor's mandate, the Commission has conducted on-site inspection tours of various Fire Service facilities, examined fire equipment and apparatus, and evaluated practices and procedures in staffing, training curriculums and practices, and equipment and apparatus practices and maintenance thereof.

Unfortunately, the Commission has noted serious deficiencies in the Fire Service--including leadership, organization, procedures and practices, equipment, training, and physical facilities. These evidence a deterioration that has most probably occurred over a prolonged period of time, and a regrettable failure to keep current with developing technology. The Commission urges that the necessary revitalization be accomplished as soon as possible, for the welfare of the Commonwealth, its citizens and visitors.

(The Commission notes the willingness of the United States Fire Administration, National Fire Academy, National Fire Protection Association, the Center for Fire Research of the National Bureau of Standards, and the New York City Fire Department to provide assistance within the scope of their respective mandates and capability to do so.)

* * *

RECOMMENDATION IV.-2: ***Establish a strong leadership program based on proper qualifications including fire experience, education, management, and administrative ability.***

FINDING: One of the most pressing needs identified by the Commission is for strong, knowledgeable leadership of the Fire Service. Professional leadership is needed for communicating the needs for and priorities that must be given for fire safety to the Governor, the legislature, the citizens of Puerto Rico and most importantly to the Fire Service itself. Programs are needed to build the qualities of leadership throughout the Fire Service. Cooperation and support from the Government is essential for the success of the leadership program.

* * *

RECOMMENDATION IV.-3: ***Design and implement a Fire Service organizational structure with four primary organizational components: Operations; Fire Prevention; Support Services; and Administration each headed by a qualified fire officer that are interchangeable in these assignments and***

***who collectively serve with the Chief and Assistant Chief as the Executive Staff of the Fire Service.***

FINDING: There was little evidence of the Fire Service organization structure exhibiting positive and productive interrelationships. The structure of each sub-organizational unit should be functionally related in so far as possible within its major organizational component, i.e., personnel related functions and operations related functions. The flexibility of assignments at each managerial level builds a cadre of leadership potential and appreciation and support for the overall Fire Service mission.

* * *

RECOMMENDATION IV.-4: ***Establish a planning unit within the Fire Service to analyze fire and population trends, area development, land use, building construction, water resources, etc. in order to develop long range planning for fire protection.***

FINDING: There are communities outside of the metropolitan districts which were once considered as rural areas with light population and building density that are now experiencing an enormous growth rate in building construction and population gains but have not had any significant improvement in their fire protection, water supply and road access. They can now be classified as light and heavy commercial areas with substantial numbers of high rise occupancies. Some of these areas are being protected by one man fire companies with apparatus and equipment of questionable operational capability.

* * *

RECOMMENDATION IV.-5: ***Formulate and adopt comprehensive rules and regulations as a basis for standardized policies and procedures for the entire Fire Service.***

FINDING: There is a complete absence of definitive written policy guidelines; most matters seem to be handled by word of mouth. There is no book of Rules and Regulations that officers or firefighters may refer to for answers to situations. The regulations that exist were originally written in the 1940's. While they were adequate and sufficient for the inception of the Fire Service, today there is an urgent need for documented policies and regulations as typically used by fire departments. The absence of rules leads to individual interpretations of many important matters, interpretations which differ from district to district and individual to individual. This obviously leads to chaotic conditions totally at variance with effective management. No professional department can function effectively using ad hoc practices.

Policies for standardized personnel assignment, professional development, training and transfers should be promulgated. Present practices appear to be demoralizing to members.

* * *

RECOMMENDATION IV.-6: ***Determine feasibility of integrating all risk emergency management functions into the Fire Service.***

FINDING: The Commission notes the Fire Service resources are under utilized, and consideration should be given to expanding their emergency management functions.

* * *

RECOMMENDATION IV.-7: ***Establish a fire investigation unit within the Fire Service.***

The functions to include:

- Statistics gathered by trained fire investigators will provide a clear picture as to type, structure and cause of fire, i.e., smoking, carelessness, arson, etc.
- Information provided will give the fire prevention officer insight to implement a public safety awareness program.
- Fire activity in districts due to changes in population and structural use will also provide data to the fire chief to adjust his manpower and equipment resources.
- Statistical data and information provided by the fire investigator to the fire chief supplies the necessary information so that appropriate action can be implemented by the fire service. These actions will help to reduce fire incidents, reduce fire losses, reduce fire insurance premiums, reduce fire deaths and help to reduce the potential for increase of unemployment as a result of fires.

FINDING: The Commonwealth lacks a professional fire investigation program to determine fire cause and origin. This was evidenced by the absence of an in depth investigation of three previous fires, obviously arson-related, at the Dupont Plaza Hotel shortly before the tragic fire. Cause and origin investigations by the Fire Service are essential in assessing legal responsibility, and provide crucial feedback for codes/regulation revisions and fire prevention programs.

* * *

RECOMMENDATION IV.-8: ***Consider the adoption of the arson strike force concept and supporting strategies to address and abate the problem of the crime of arson in the Commonwealth.***

FINDING: There is not an apparent systematic approach to identifying the extent of the arson problem and a community wide means of abating the heinous and damaging effects of the crime of arson. Coupled with a sound fire investigation process, an arson strike force program involving fire, law enforcement, justice system, insurance, media, housing and other public and private interests can serve to mitigate this plague on the community and the resultant positive effect on sensitive housing stock and the economy. Support systems such as arson information management systems are appropriate to support such efforts.

* * *

RECOMMENDATION IV.-9: ***Establish a mutual aid agreement protocol between the Puerto Rico Fire Service, other public fire departments, Federal agencies and private enterprises that have firefighting capabilities and resources. Encourage liaison between industrial fire brigades and the Fire Service to assist when required.***

FINDING: The fire protection resources, public and private, need to be utilized to the maximum in mutual support of each other. Formal negotiated mutual aid agreements that clearly define respective responsibilities, response configurations, command structure, logistical support and cooperative training need to be developed and adopted.

* * *

RECOMMENDATION IV.-10: ***Establish responsibilities and capabilities for marine firefighting.***

FINDING: The Fire Service has no marine firefighting capability, and the Commission is informed that the U.S. Coast Guard has only limited capability. More than 500 tourist cruise ships visit the port city of San Juan each year. These floating hotels and the ships of commerce are not currently provided with appropriate fire protection.

* * *

RECOMMENDATION IV.-11: ***The work schedules, work hours and working conditions need to be revised to create a work environment that is more productive and therefore utilized for training, maintenance, inspection and readiness activities.***

FINDING: The present working hours and schedules as observed lend themselves to poor time management and lack of productivity. The emergency activity level is such that the present schedule is difficult to justify. There is no acceptable justification for the lack of effort observed including sleeping in dormitories under the conditions of the present work schedule. Consideration should be given to work schedules of not less than two or even one shift per twenty-four hour period. Any increase in work hours should be accompanied in part with a commensurate increase in salary. This should also address some of the staffing level problems.

* * *

RECOMMENDATION IV.-12: ***Establish an independent and improved personnel management system within the Fire Service.***

This system to include:

- Determination of manpower needs and prepare manpower requests on behalf of the Fire Chief.
- Determination of qualification standards for entry level recruits.
- Determination of examination criteria for entry and promotion levels based on scrupulous adherence to a merit system.
- Maintenance of all necessary personnel records on all employees.
- Development of job descriptions and explicit standards and qualifications for all uniform ranks.

FINDING: The centralized personnel system is indicated as not being responsive to the personnel services and needs of the Fire Service.

* * *

RECOMMENDATION IV.-13: ***Appointment to, and promotions within the Fire Service should be based on a competitive merit system and professional examination using recognized fire service standards.***

FINDING: Current practices for appointment to and promotion within the Fire Service are inappropriate and as a result morale is very low. There is a serious need for qualified and motivated personnel in all ranks, and notably in the Company and Chief Officer ranks. There also is a serious need for an improvement in professionalism, respect and prestige of the firefighter. Firefighters should be expected to dedicate 100% of their "duty time" to fire prevention, fire fighting, including the increase in knowledge through training and study become better firefighters and inspectors. Remuneration should be increased in order to attract high caliber candidates. Officers, as supervisors, deserve to be paid more than subordinates; salaries must be commensurate with the responsibilities discharged. Under current salary tables, it is conceivable that a Firefighter with years of seniority would earn more than a junior officer who supervises him. This does not lend itself to discipline, and is damaging to individual incentive.

* * *

RECOMMENDATION IV.-14: ***Establish staffing levels that are in conformance with acceptable fire service standards to insure response of an effective fire suppression team.***

FINDING: The Commission has, by on-site tours of fire stations in both metropolitan and suburban areas of Puerto Rico, determined that the Fire Service is particularly understaffed in suburban and rural areas. It appears to be common practice to staff rural fire stations with one firefighter on duty with no provision for recall system to increase manpower in the event of a major emergency.

* * *

RECOMMENDATION IV.-15: ***Augment the human resources of the Fire Service for fire suppression, fire prevention and other support services through the use, where appropriate, of volunteers, auxiliaries, student firefighters, reserves, service organizations and youth organizations, i.e., Boy Scouts, Girl Scouts and Explorers.***

FINDING: The service area of the Fire Service is varied from urban, suburban and rural and potentially provides several opportunities to augment its limited resources. These opportunities are unlimited if provided proper Fire Service leadership and support and can be particularly effective because of involvement of the citizen in the solutions to fire protection. Examples are volunteer firefighters in suburban and rural areas, student sleepers from colleges and university, youth organizations to assist in fire prevention activities, and service clubs that assume responsibility for specific sponsorship of support activities.

* * *

RECOMMENDATION IV.-16: ***Provide for firefighter health and safety by adopting recognized standards and guidelines related to provision, use, maintenance, training, and enforcement relating to personal use equipment.***

FINDING: Few Units have Self Contained Breathing Apparatus; those which do have them often do not have a sufficient number to provide one for each member working, and maintenance policies or procedures are woefully lacking, as is a real awareness of the need for such maintenance. Federal safety guidelines call for positive pressure Self Contained Breathing Apparatus for each member on duty, and establishment of related training and maintenance programs.

* * *

RECOMMENDATION IV.-17: ***Develop employee health and assistance programs including periodic medical exams and standards, stress prevention programs, physical fitness regimens and assure the adequacy of all existing programs. Maintain all necessary records and develop a medical monitoring system in order to effectively control all members on extended medical leave and limited duty.***

FINDING: The largest continuous investment the Fire Service makes is in its personnel and as such the physical and psychological maintenance programs are over the term cost effective. It has been reported that there is no systematic management or monitoring of employees, therefore there are abuses of the present system.

* * *

RECOMMENDATION IV.-18: ***Establish a budget analysis and research system.***

This system to include:

- Determination of budgetary and fiscal requirements for the next fiscal year based on analysis of manpower and equipment needs of the department.
- Preparation of all budget requests for review by the Fire Chief prior to submission.
- Development of a five-year budget plan for the Fire Service with defined goals and achievement milestones.

FINDING: The Fire Service procedures in this area appear deficient.

* * *

RECOMMENDATION IV.-19: ***Establish a computerized management information system within the Fire Service of Puerto Rico to handle inspections, permit actions, fire response, incident and investigation data and other similar information.***

FINDING: Essential information required to effectively manage a modern fire service is not now readily available. A management information system will provide the administrative and support staff of the fire service with the capability to properly assess the needs of the department and assist in short and long range planning.

* * *

RECOMMENDATION IV.-20: ***Establish a professional training program at the entry, in-service, and all command levels to be headed by a qualified training officer.***

Training program and staffing suggestions as follows:

- The Chief of Training to be a career firefighter with qualifications in instruction and education.
- Staff the College with experienced Line Officers, qualified as instructors with appropriate instructional credentials, knowledgeable in operations strategies and tactics, and supported by qualified firefighter instructors experienced in operational procedures and use of equipment.

- Develop an overall plan for the expansion and revitalization of the Department's Fire College on the present site, to include facilities for training of firefighters of all command levels in the area of:

    Self Contained Breathing Apparatus
    Rope Rescue
    Engine (Pumper) Company Operations
    Ladder Company Operations
    Extrication
    High Rise Firefighting
    Emergency Vehicle Operations (Chauffeur Training)
    Officer Induction Training
    Entry Level Training
    Hazardous Materials (HazMat)
    Operations
    Company In-Service Evaluations

- Develop criteria and curricula for training programs required.

- Maintain detailed records of training specifying subject matter, individuals, and Units.

- Develop a Department-wide in-service training program, and schedule on duty members to be trained by supervising line officers during the tour of duty.

FINDING: This can be divided into two equally important phases: entry level instruction, and continuing professional in-service programs. The training facility was found to be seriously under-funded, improperly staffed, insufficiently equipped, and lacking in adequate trained instructor personnel. A formal curriculum is almost nonexistent, record keeping is poor, and the overall program is totally inadequate for a professional Fire Service. Inordinate emphasis is placed on rescue and extrication techniques, which the Commission understands is not within the legal responsibility of the Fire Service.

In-service training, once a member has been assigned to a Fire Unit, is virtually non-existent. Continued reemphasis of basic firefighting training and skills is of paramount importance for a professional firefighter, yet this area is not being given the importance it commands. In addition, training programs must be developed to improve the managerial and administrative skills of all members of the department.

* * *

RECOMMENDATION IV.-21: ***Establish a Safety Unit under the direction of an Officer.***

Functions of the Safety Unit to include:

- The recording and analysis of all service injuries to department members.
- Conducting of research and development of tools and equipment.
- Response to all major alarms, to assist the Incident Commander and advise him of existing safety hazards.

FINDING: This essential function is not now being addressed adequately.

* * *

RECOMMENDATION IV.-22: ***Establish an Operations organizational component and; designate a Chief Officer with appropriate qualifications to serve, as its Chief, who shall have the responsibilities for management and administration of the daily activities and functions of the fire suppression forces.***

The responsibilities shall include:

- Establishment of minimum criteria for firefighter safety equipment based on recognized standards.
- Determination of staffing levels of fire suppression units.
- Maintenance of standards of discipline.
- Institution of and compliance with an in-service training program.
- Ensure operational readiness.
- Management of in-service fire prevention inspection programs in coordination with the Fire Prevention Division.
- Institution and maintenance of pre-fire planning for occupancies within each station area with emphasis on high risk occupancies.
- Preparation of plans for emergency management and disaster situations (i.e., hurricanes, civil disorders, etc.) in coordination with other appropriate public and private organizations.
- Maintenance of apparatus, buildings, and equipment.
- Coordination with administrative, service and fire prevention the analysis of fire activity and trends for the establishment and/or redeployment of resources, the planning and acquisition of equipment and needs for inspection and enforcement.

FINDING: Fire suppression is a reactive force that serves to abate the consequences of fire. Its success, effectiveness and efficiency is highly contingent on the management, leadership and control of this team resource, the staffing, training, equipment, discipline that are provided and maintained. Additionally, fire suppression forces can be proactive through fire prevention and pre-plan inspection activities. Observations and interviews indicate and reinforce that the above stated elements are seriously lacking or deficient. Fire incident management or command systems are not in evidence.

* * *

RECOMMENDATION IV.-23: ***Establish an incident command system including clear lines of responsibility and authority.***

FINDING: The Commission generally found the lines of responsibility and authority to be vague and altogether too subject to on-the-scene interpretation. These must be clearly defined. The On-Scene Fire Commander must be in complete charge of the scene until the fire has been declared under control by that Officer. Then and only then should control shift to another authority.

* * *

RECOMMENDATION IV.-24: ***Establish standard firefighting operations procedures.***

FINDING: Standard firefighting procedures are missing. This is an adjunct of the standardization and training issues; Fire Service-wide policies and procedures on fire attack, ventilation, rescue, and overhauling must be developed and promulgated. Additionally, a clearly defined Command structure must be developed and adhered to by all Units within the Fire Service. A Fire Service-wide uniform standard must be developed and enforced.

* * *

RECOMMENDATION IV.-25: ***Develop specialized firefighting capabilities as may be needed throughout the Commonwealth such as for flammable liquids and hazardous materials incidents response capability.***

FINDING: The Commission notes that foam supplies are severely limited or non-existent in many areas. The Commission was made aware of the presence of a large petro-chemical industry on the Island, which would require adequate foam supplies and response capability.

* * *

RECOMMENDATION IV.-26: ***Develop a recall system to assure response of off-duty personnel to meet manpower requirements during major emergencies.***

FINDING: It was noted that off-duty firefighting personnel responded to the Dupont Plaza fire unequipped to perform their firefighting functions. Procedures must be developed to assure that off duty members recalled to perform emergency duty are fully equipped with personal safety fighting equipment.

* * *

RECOMMENDATION IV.-27: ***Establish a state-of-the-art dispatching and supporting communications system.***

- Conduct an analysis of present response assignments and revise same in order to provide a response of a fire team to every alarm received.
- Develop a Communications Manual specifying communications operating procedures, code signals, major alarm fall-back procedures, etc., to assure adequate response of Units to every emergency.
- Establish a mobile communications repair and installation unit to assure communications capability to all Units at all times.
- Establish a mobile command post unit to respond to all major alarms.

FINDING: Overall, equipment is generally outdated, not properly maintained, available in insufficient quantities, and suffers from a lack of standardization. Trained personnel and technicians are lacking in numbers that would meaningfully serve a professional Fire Service.

* * *

RECOMMENDATION IV.-28: ***Develop a long range purchase, replacement, and maintenance program for Fire Service apparatus and equipment.***

FINDING: There is a lack of necessary firefighting apparatus and equipment to effectively and safely fight fires that are nearly too numerous to list. Purchasing procedures and assignment policies are, at best, puzzling; e.g., large apparatus are assigned in urban areas where they are unable to negotiate on narrow streets within the response areas, and rural Units cannot negotiate hilly terrain. Rural areas, in the absence of water supplies, should be equipped with tanker trucks. New apparatus is purchased devoid of any new equipment, e.g., Self Contained Breathing Apparatus, power saws, forcible entry tools, etc.

Many units also lack basic items, such as forcible entry tools, which are of absolute necessity for firefighting. Some apparatus was found in unusable condition.

As previously noted, some first line Units are of unreliable condition; some seem to be "misassigned" to particular areas; and purchase criteria and procedures should be streamlined and expedited. There is no stated apparatus replacement policy.

Concerning the maintenance that is vital to effective management of the Department, there is no meaningful program. It must be pointed out that an ongoing, regularly scheduled maintenance program is of great importance in assuring effective fire protection as well as prolonging apparatus life. It is therefore a cost effective management tool, and one which serves the best interests of the members, the Department, and the community. The Commission strongly urges that such a program be immediately instituted whereby normal maintenance procedures be performed by on duty firefighters in Quarters, and a reliable record keeping system be implemented.

The present practice of sending fire apparatus--emergency vehicles--to a central repair facility or other agency shop is unacceptable. While an apparatus "waits its turn" in such a "first come, first served" facility, the area to which the apparatus is assigned is left unprotected. Fire apparatus cannot queue with all other state vehicles; to do so is not in keeping with the emergency aspect of a Fire Service.

* * *

RECOMMENDATION IV.-29: ***Establish a fire apparatus and equipment maintenance system.***

This system to include:

Repair and Transportation Unit to:

- Develop specification standards for pumpers, ladder and specialized apparatus; special consideration for apparatus needs of suburban and rural areas (i.e., topography, road conditions, water supply, building heights, etc.).
- Establish a mobile repair unit for minor repairs and tire changes.
- Establish daily, weekly, and monthly minor maintenance schedules to be performed by on-duty Fire Service members.
- Establish a major preventive maintenance program for all vehicles.
- Establish maintenance and repair of fire apparatus and equipment by a specialized repair service within the Fire Service or controlled by the Fire Service because of its emergency service.
- Maintain reserve fire apparatus in sufficient numbers to replace apparatus that are out of service for maintenance and to provide additional apparatus for major incidents.

Equipment Repair and Maintenance Unit to:

- Purchase hose and equipment.
- Maintain reserve inventory of equipment.

- Repair damaged/defective equipment.
- Testing, repair, and replacement of equipment to be in accordance with NFPA standards.
- Repair Self Contained Breathing Apparatus by qualified repair technicians and an appropriate refill capability for tanks.
- Maintain reserve supply of Self Contained Breathing Apparatus tanks including remote depots to assure continuous availability.

FINDING: The nature of the firefighting apparatus and equipment was readily observed and frequently reported. These are the tools of the firefighter's trade and must support the effectiveness and efficiency of firefighting operations. There is little, if anything, that can be stated that is positive regarding the quality, the condition, the readiness and the adequacy of firefighting apparatus and equipment. It is noted that fire apparatus is in service that is not fully operational, that firefighters have insufficient and inappropriate safety clothing and equipment, that fire stations are placed out of service where apparatus needs maintenance due to lack of replacement equipment and priority maintenance systems, and that apparatus and equipment are assigned inappropriate to need and use.

* * *

RECOMMENDATION IV.-30: ***Study the feasibility of establishing private service contracts between transportation repair shops and the Fire Service to compensate for unforseen increases of emergency repairs to apparatus and equipment that would impact on the delivery of fire service to the community.***

FINDING: The current system ignores commercially available services while essential apparatus and equipment await repair--sometimes for months--in centralized government shops.

* * *

RECOMMENDATION IV.-31: ***Establish a supply service to develop specifications for tools and equipment addressing local needs, i.e. topography, structures, roads, water supply, etc., with recognized fire service standards as guidelines.***

FINDING: The quality, condition, appropriateness, maintenance, type and amounts of fire equipment and tools was observed to be generally deficient in all respects.

* * *

RECOMMENDATION IV.-32: ***Institute a periodic inspection program for personnel, apparatus, equipment, quarters, hydrants, and records of fire training and fire prevention activities.***

Chief and Company Officers should conduct daily up to semi-annual routine and cyclical inspections of all personnel, fire fighting equipment, apparatus, quarters, and firefighters' personal safety equipment to insure the proper care, maintenance, and appearance of same. Additionally, records of training, fire prevention and fires should be reviewed. Controls and necessary related records must be established and maintained to assure a high standard of performance and compliance at all times.

FINDING: There appears to be almost a total absence of qualitative and quantitative standards; any documented history through adequate records and retention; goals and objectives or other measurements of performance and accountability for which a modern fire service should be justified and sustained. This was noted by observation and the inability to fulfill requests for information and records.

## ACKNOWLEDGMENTS

In the process of the Commission fulfilling its obligations, the assistance of those who have contributed is hereby recognized.

- Ms. Norma M. Santiago--our sincere appreciation for her tireless, considerate, personal and professional administrative support.
- Mrs. Debbie Cramer, of the Center for Fire Research staff--our appreciation for her patience, forbearance and professionalism in the final preparation of this report.
- Members of the Fire Service of Puerto Rico--our gratitude for the services and logistical support they cordially provided.
- The individuals and representatives of organizations-- public and private who were interviewed by the Commission--our appreciation for their candor, contribution and cooperation. Although frequently expressing different viewpoints, their interest and input was sincere and concerned.

## SPECIAL ACKNOWLEDGMENT

- Raul Gandara, Founding Fire Chief of the Fire Service of Puerto Rico--our respect and admiration for his invaluable knowledge and experience; the sharing of his philosophy and the sharing of his invaluable knowledge and experience; the inspiration of his pragmatism and philosophy; and his unyielding and exemplary love for his Puerto Rico.

# APPENDIX 1

## EXECUTIVE ORDER NO. 4844

## CREATION AND APPOINTMENT OF COMMISSION ON FIRE SAFETY

EXECUTIVE ORDER NO. 4844

## EXECUTIVE ORDER OF THE GOVERNOR OF THE COMMONWEALTH OF PUERTO RICO

TO ESTABLISH THE COMMISSION ON FIRE SAFETY; DEFINE ITS MEMBERS AND FUNCTIONS AND FOR OTHER PURPOSES.

WHEREAS Ensuring the safety of the public is a primary responsibility of government.

WHEREAS The threat of fire is a continuous danger to the safety of the public and can be the cause of deaths and injuries as those which tragically occurred last December 31st.

WHEREAS Agencies and officials of the Commonwealth of Puerto Rico are charged with establishing and enforcing codes and regulations designed to minimize the chance of fires.

WHEREAS The operational systems and practices of the Fire Department and the codes and regulations concerning fire safety are in need of periodic review to identify areas for possible improvement in order to properly protect the public.

WHEREAS The Commonwealth of Puerto Rico is desirous of achieving in the shortest possible time the highest practicable level of safety from fire, utilizing the latest information available on new technologies that may permit the most efficient improvement in fire safety at a lower cost than was possible in the past.

WHEREFORE: I, Rafael Hernández Colón, Governor of the Commonwealth of Puerto Rico pursuant to the powers conferred by the Constitution and Laws of the Commonwealth of Puerto Rico, and to achieve the objectives mentioned before, do hereby establish:

FIRST The Commission on Fire Safety is established.

SECOND The Commission will consist of ten members whom I hereby appoint. These members are: Mr. Clyde Bragdon, The United States Fire Administration; Dr. Jack Snell, the

Director of the United States Center for Fire Research; Mr. Jack Sanders, former Chairman of the Board of the National Fire Protection Association; Mr. Raúl Gándara, former Chief of the Puerto Rico Fire Department; Mr. Filiberto García, former Member of the Planning Board of Puerto Rico; Mr. Pedro Oscar Schuck, former Chief of the Puerto Rico Fire Department; Mr. Benjamín Acosta, expert risk insurance adjuster; and the following officers of the New York City Fire Department; Mr. Joseph Demeo, Director of the Fire Prevention Division; Mr. Carlos Rivera, Borough Commander of Staten Island; and Mr. Anthony Romero, Deputy Marshal.

I hereby appoint Mr. Raúl Gándara and Mr. Clyde Bragdon as Co-Chairmen of the Commission.

THIRD The purpose of the Commission is distinguishable from that of those agencies of the Commonwealth of Puerto Rico that are charged with the responsability for investigating specific fires. The Commission is to review the operational systems and practices of the Fire Department, including its inspection procedures, and to review all codes, laws, and regulations currently in effect that pertain to fire safety in residential, office, and public-assembly occupancies within the Commonwealth of Puerto Rico. Both reviews are to be made with a view to recommending improvements that will enable Puerto Rico to achieve a leadership role in fire safety at a reasonable cost.

FOURTH The Commission is hereby ordered to conduct a thorough review of the operational systems and practices of the Fire Department, including its inspection procedures, to determine how they might be improved.

The Commission is hereby ordered to conduct a thorough review of all conditions and regulations in effect that pertain to fire safety in residential, office, and public-assembly occupancies within the Commonwealth of Puerto Rico to determine how they might be improved to achieve in the shortest possible time the highest practical level of fire safety.

The Commission is ordered to work closely with all existing organizations that in its judgment can assist it in achieving the purposes of this order.

All agencies, instrumentalities, officers, and employees of the Commonwealth of Puerto Rico are directed to co-operate with and assist the Commission in its work.

The Commission is directed to deliver its recommendations to the Governor not latter than March 15, 1987.

FIFTH The Commission expires on March 15, 1987, or when it submits its final report to the Governor, whichever occurs first, at which time it will disolve automatically.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Commonwealth of Puerto Rico to be affixed this 13th day of January, 1987.

RAFAEL HERNANDEZ COLON
Governor

Given in accordance to law, as of today, January 13 , 1987.

Héctor Luis Acevedo
Secretary of State

# APPENDIX 2

## MEMBERS OF THE COMMISSION ON FIRE SAFETY

## THE COMMISSION ON FIRE SAFETY

Benjamin Acosta, Expert
Risk Insurance Adjuster
San Juan, Puerto Rico

Clyde A. Bragdon, Jr., Administrator (Co-Chairman)
U.S. Fire Administration
Washington, DC

Joseph M. DeMeo, Chief of Fire Prevention
Fire Department - City of New York
New York, New York

Raul Gandara, Former Fire Chief (Co-Chairman)
Fire Service of Puerto Rico
San Juan, Puerto

Filiberto Garcia, Former Member of the Planning
Board of Puerto Rico
San Juan, Puerto Rico

Carlos M. Rivera, Asst. Chief of Department
Fire Department - City of New York
New York, New York

Anthony Romero, Deputy Chief Fire Marshal
Fire Department - City of New York
New York, New York

Jack Sanders, Western Representative
National Fire Protection Association
San Diego, California

Pedro Oscar Schuck, Former Fire Chief
Fire Service of Puerto Rico
San Juan, Puerto Rico

Jack E. Snell, Director
Center for Fire Research
National Bureau of Standards
Gaithersburg, Maryland

# APPENDIX 3

## SENATE JOINT RESOLUTION 1733 OF 1987

## APPROPRIATION FOR FIRE SERVICE

COMMONWEALTH OF PUERTO RICO

10th Legislature
Regular
Assembly

Third

Session

S.J.R. 1733

of 1987

Submitted by

Referred to

# JOINT RESOLUTION

To appropriate the sum of 4 millions (4,000,000) dollars to recruit inspectors and personnel in charge of fire prevention and extinguishing, for the purchase of equipment and material and to carry out studies leading to review the regulation that exists regarding fire prevention and safety and also for evaluating operating systems within the Fire Service in Puerto Rico.

Be it resolved by the Legislature of Puerto Rico:

Section 1 - Four millions (4,000,000) dollars unencumbered with State Treasury funds are assigned to the Fire Service of Puerto Rico and will be used and distributed as follows:

(a) For the recruitment of additional personnel to be used as inspectors and for different personnel for fire extinguishing and prevention area -- $1,446,220.

(b) For the acquisition of material and for the purchase of prevention, inspection and extinguishing equipment -- $2,513,780.

(c) To carry out studies leading to review the regulation that exists concerning fire prevention and security and in relation to operating systems within the Fire Service of Puerto Rico --- $40,000
Total -- $4,000,000

Section 2 - This Joint Resolution shall take effect immediately after its approval.

# APPENDIX 4

## HOUSE BILL 1011

## AMENDMENT TO THE ACT OF THE FIRE SERVICE OF PUERTO RICO

## EXTEND THE FACULTIES AND POWERS OF THE FIRE CHIEF

THE COMMONWEALTH OF PUERTO RICO

10th Legislative
Assembly

3rd Ordinary
Session

H.B. 1011 -

________________, ______

Submitted by ______________

Referred to Government

## AN ACT

To amend the eleventh (11) clause and add the twelfth (12) and thirteenth (13) clauses to Article 4, add a new Article 9, amend Article 12 and redesignate it Article 10, add new Articles 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20, amend Article 13 and redesignate it Article 21, amend Article 14 and redesignate it Article 22, add a new Article 23, redesignate Articles 9, 10 and 11 as Articles 24, 25 and 26, respectively, Act May 9, 1942, No. 158, as amended, in order to extend the faculties and powers of the Fire Chief of Puerto Rico in regard to the prevention of fires and the inspection of lots, buildings and stuctures, prescribe that a study of the actual regulations in effect and of the operational systems of this service be made within the period of time specified in this law, and to establish penalties.

## STATEMENT OF MOTIVES

The Act of the Fire Service of Puerto Rico dates from the year 1942. During all the time elapsed since its enactment said act has been amended four times. The modifications added have been solely directed to change the official name of the Fire Service, to typify criminal conduct and to increase established penalties.

The social and economic development registered in Puerto Rico from the year 1942 to the present time has brought as sequel dramatic changes in the population's growth and concentration in urban centers, especially in the metropolitan area of San Juan. During these years the design, construction and remodeling processes of the multistory buildings and structures lodging residential units, hotels, hospital, schools, commercial establishments, industries, and other service enterprises have evolved strikingly. Changes in technology and in life standards have been equally significative.

The Fire Service of Puerto Rico must answer to the needs, hazards and dangers of modern life in order to effectively protect life and safety throughout the Island preventing and extinguishing fires. The rendering of this extremely essential service has to insure that the safety and fire prevention regulations require the adoption of the most modern and effective systems for minimizing those factors which produce and spread fire.

An aggressive and systematic program aimed at the inspection of lots, buildings and structures is essential in order to guarantee the enforcement of safety measures adopted by regulation. The inspection and rescue exercises programs must be carried out even more strictly in those places and structures which present greater risk of loss of human life in the event of fire or explosion, such as multi-story buildings, hotels, schools, hospital and other buildings devoted to the holding of assemblies or public spectacles.

The fire of December 31, 1986 has revealed the undeferable need to extend the legal frame of the Fire Service of Puerto Rico in order to provide the Fire Chief additional powers which may lessen his labor of prevention of fires and the inspection of lots, buildings and structures.

Through this law additional restrictive means are provided and mutual duties corresponding to officials of the Fire Service of Puerto Rico and to the owners, managers and occupants of buildings, structures and lots are more distinctively established; while the penalty for incurring in criminal conduct is increased.

BE IT ENACTED BY THE LEGISLATIVE ASSEMBLY OF PUERTO RICO:

Section 1. - The eleventh (11) clause is hereby amended and a new twelfth (12) and thirteenth (13) clauses are added to Article 4, Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article 4. - [~~Powers-and-duties,-recruitment, regulations,-reports,-penalties~~] The duties and powers of the Fire Chief shall be:

(1) ..............................................

(11)[~~The Fire Chief is hereby further authorized to establish~~] To establish rules and prescribe rules and regulations for the observance of proper safety conditions and the prevention of fires in places devoted to amusements and sports, in industries, commercial establishments, hotels and hospitals, in buildings devoted to public exhibitions or spectacles, in residential apartment houses and multistory buildings, on public highways, and in homes, as well as in any other building, structure or lot. [~~and these~~] These rules and regulations, after being promulgated by the Governor and published in two newspapers of general circulation in the Commonwealth of Puerto Rico, shall have the force and effect of law. [~~The violation of any provision of the rules and regulations established by the Fire Chief and approved and promulgated by the Governor shall be punishable by a fine of not less than five (5) dollars nor more than one hundred (100) dollars, or in default thereof, by imprisonment in jail for a term of not less than five (5) days nor more than ninety (90) days, or by both penalties, in the discretion of the court.~~]

(12) To request and obtain technical services from any official of the Government of the Commonwealth of Puerto Rico that in his opinion are necessary to carry out the purposes of this law.

(13) To collaborate with and advise anyone who requests so, in the preparation of the emergency evacuation plan from buildings and structures on fire or in the event of any other emergency, and in the performance of the simulacrum exercises of these plans."

Section 2. - A new Article 9 is hereby added to Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article 9. - The Fire Chief or any member of the Fire Service of Puerto Rico duly authorized to make inspections and investigations shall perform such inspections and investigations of lots, buildings and structures during regular working hours or at any other time if the particular situations so calls for, in order to detect any violation of the safety and fire prevention laws or regulations, as well as the existence of any situation or practice that enhances the probability of producing fire or an explosion or death or physical injuries to people or damages to property."

Section 3. - Article 12 is hereby amended and redesignated Article 10, Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article [~~12~~] 10. - [~~Any-member-of-the-Puerto-Rico Fire-Service-who-is-assigned-by-the-Fire-Chief to-carry-out fire-prevention-work-shall-have, in-the-performance-of-his duty,~~] To perform the inspections and investigations referred to in the previous article, the Fire Chief shall have free access to [~~all-places-devoted-to-industrial-and-commercial occupations,-amusements-and-sports,-to-buildings-devoted-to public-exhibitions-or-spectacles,-to-apartment-buildings, schools,-hotels, and dwelling-houses;-and-shall-have-full power-and-authority-to-inspect-such-places-or-any-part thereof-for-the-purpose-of-securing-information or-making investigations-in-regard-to-the-safety-of-persons,-and-to-see~~

~~that the rules and regulations established by the Fire Chief and promulgated by the Governor are strictly complied with, he may order the owners, managers, impresarios, lessees, representatives, or tenants to make such alterations, repairs and installments required for the safety of the occupants and for the protection of the neighbors and the public in general against fire risk, and if such order is not complied with within the term granted therefor, and the owners, managers, impresarios, lessees, representatives or occupants have not offered well-grounded reason to the satisfaction of the Fire Chief for failing to comply therewith, the latter shall, through his attorney, under the immediate supervision of the Secretary of Justice, institute the corresponding judicial proceedings before the Superior Court of Puerto Rico, and the latter shall, after the parties have been heard, order the closing of the said industries, businesses, hotels, apartment buildings, amusements and sports, buildings devoted to public exhibitions and spectacles, schools and dwelling houses, and the said court may, if it deems it advisable, grant to such owners, managers, impresarios, lessees, representatives or occupants of said buildings, such period of time as he may deem advisable for compliance with the order of the Fire Chief,~~] lots, places devoted to amusements and sports, commercial establishments, hotels, hospitals, buildings devoted to public exhibitions or spectacles, multistory buildings, as well as to any other building or structure devoted to nonresidential use."

Section 4. - A new Article is hereby added to Act May 9, 1942, No 158, as amended, in order to read as follows:

"Article 11. - If following an inspection or investigation, the Fire Chief decides that the owner, manager, agent or occupant of a lot, building or structure, or his representative, has violated any disposition of the safety or fire prevention laws or regulations, he shall notify in writing the person concerned of the nature of the violation granting a reasonable term to correct the deficiency pointed out, considering the severity of the violation and the hazard it poses on the safety of people and property. The issued order shall prescribe the practices, means or methods that the concerned person shall adopt to comply with the laws and regulations in effect and shall also warn him that in the event he does not take corrective action or comply with the order within the prescribed term, the Fire Chief may impose suitable sanctions for such breach of law."

Section 5. - A new Article 12 is hereby added to Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article 12. - Within the term prescribed to take corrective action, the person concerned may request the Fire Chief the reconsideration of the order, establishing the grounds on which he makes such petition. The Fire Chief shall issue an order confirming or modifying his decision."

Section 6. - A new Article 13 is hereby added to Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article 13. - The Fire Chief, upon notification and hearing, shall have the power to impose administrative fines up to ten thousand (10,000) dollars due to the violation of safety or fire prevention laws or regulations or due to the noncompliance of the orders issued. The same violation incurred into every day shall be considered as a new and separate violation. Likewise, the Fire Chief may order the suspension or revocation of any permit or license granted in accordance with applicable laws, or the closing of the building involved. The order suspending any permit or license must not exceed six (6) months."

Section 7. - A new Article 14 is hereby added to Act May 9, 1942, No. 158, as amended, in order to read as follows:

"Article 14. - If the Fire Chief decides that the safety or fire preventions laws or regulations or of the orders issued constitutes a severe hazard to the safety of people and property, he may order the suspension or revocation of any permit or license granted in accordance with applicable laws, or the closing of the building or structure involved. Within seventy-two (72) hours after the date of notification of such provisional order, the Fire Chief will hold an Administrative hearing in which he shall decide if such provisional order becomes a permanent order or if it is to be revoked. Orders issued under this Article shall be notified in person to the owner, manager, agent or occupant of the property affected, or his representative."

Section 8. - A new Article 15 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 15. - The Fire Chief may resort to the Superior Court of Puerto Rico to request that any cease and desist order issued or any corrective action order issued be put into effect. Failing to comply with a court order granting such petition constitutes contempt of court. The Fire Chief's decision shall remain in full force and effect unless there is a firm and final court decision revoking or modifying the order issued by the Fire Chief."

Section 9. - A new Article 16 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 16. - Any person adversely affected or harmed by a final order of the Fire Chief issued in accordance with this law, may request a court revision of such decision within thirty (30) days after the notification of the final order, in the Superior Court Chamber corresponding to the place where the alleged violation took place."

Section 10. - A new Article 17 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 17. - The Fire Chief may request the information he deems necessary to achieve the purposes of this law, and issue summons requiring the appearance of witnesses and the submission of data and information essential and relevant to such purposes. In addition, he may by himself or through his authorized representative administer oaths and accept depositions, data or information.

If a summons issued by the Fire Chief was not duly complied with, said official may appear before the Superior Court of Puerto Rico and request the compliance with the summons. The Court shall give priority to such petition and may issue orders making compulsory the appearance of witnesses or the submission of data or information previously required by the Fire Chief. The Court has the powers to punish for contempt of court in the event these orders are not complied with.

Nobody may refuse to comply with a Fire Chief summons or produce the required evidence or refuse answering any question regarding any inspection or investigation or because the evidence requested could incriminate him or expose him to criminal proceedings or being destitute from or suspended of his job, profession or occupation, but the deposition or evidence produced by such person at request of the Fire Chief or by virtue of a court order cannot be used or submitted as evidence against sucn person in any criminal proceeding or in civil or administrative proceedings that may result in destitution or suspension."

Section 11. - A new Article 18 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 18. - The Fire Chief will perform at least once a year an inspection of all buildings and places constituting a severe hazard to the security of people and property in order to detect any violation of safety and fire prevention laws and regulations or the existence of any situation or practice enhancing the probability of producing fire or an explosion or death or physical injuries to people or damages to property, to order that pertinent corrective measures be taken. Buildings and structures covered by this article are those residential, commercial, industrial and government buildings having four (4) or more stories, such as hotels, hospitals, schools and higher education institutions, places devoted to the holding of assemblies public exhibitions or spectacles."

Section 12. - A new Article 19 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 19. - The Fire Chief and the owners, managers, agents or occupants of lots, buildings and structures subject to the disposition of this law or of the regulations or orders issued under its protection, or their representatives, shall be responsible for enforcing and for complying with, respectively, the indication prescribed in the corrective orders and in the cease and desist orders issued by the Fire Chief."

Section 13. A new Article 20 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Article 20. - Any violation of the dispositions of this act or of the regulations or orders issued under its protection a misdemeanor and, upon conviction, the violator shall be punished by confinement for a fixed term of six (6) months or by a fine of five hundred (500) dollars, or by both penalties, in the discretion of the court".

Section 14. Article 13 is hereby amended and renamed Article 21 of Act May 9, in:

"Article (13) 21. - Any owner, manager or occupant or representative who refuses to allow entrance to the places enumerated in this law, or who otherwise interferes with any member of the Fire Service of Puerto Rico authorized to make inspections and investigations, hindering the entrance of such member to any of such places shall be guilty of a misdemeanor and upon conviction, shall be punished by a fine of not less than fifty (50) dollars nor more than five hundred (500) dollars, or in lieu thereof confinement for a term of not less than thirty (30) days nor more than ninety (90) days, or by both penalties, in the discretion of the court.

Section 15. Article 14 is hereby amended and renamed Article 22 of Act May 9, 1942 as amended in order to read as follows:

"Article (14) 22. Any person who through neglect, or because he fails to take proper precautions, causes a fire or contributes in any way through his negligence to the development and propagation thereof, shall be punish by confinement for a fix term of three (3) years. Provided, that a fire shall be considered caused by the negligence of the owner, tenant or manager of a building if said person has failed to comply with the regulations or orders of competent authorities for avoiding or preventing fires, or has voluntarily failed to purchase such fire extinguishers or other apparatus as may be required said authority".

Section 16. A new Article 23 is hereby added to Act May 9, 1942, as amended, in order to read as follows:

"Art. 23. It, as consequence of a violation to the dispositions of this Act or of the regulations or orders issued under its protection, someone caused serious physical injuries to another human being, he shall be guilty of a felony and, upon conviction, shall be punished by confinement by a fixed term of ten (10) years and a fine of five thousand (5,000) dollars. Should there be aggravating circumstances, the established fixed penalty may be increased to a maximum of fifteen (15) years; should there be extenuating circumstances, it may be reduced to a minimum of eight (8) years.

When a person causes the death of another human being, as consequence of the violation to the dispositions of this Act or of the regulations or orders issued under its protection, he shall be guilty of a felony and, upon conviction, shall be punished by confinement by a fixed term of thirty (30) years and a fine of ten thousand (10,000) dollars. Should there be aggravating circumstances, the established fixed penalty may be increased to a maximum of forty (40) years; should there be extenuating circumstances, it may be reduced to a minimum of twenty (20) years".

Section 17. Articles 9, 10 and 11 are renamed Articles 24, 25 and 26, respectively, of Act ...":

Section 18. As soon as this Act takes effect the Fire Chief shall conduct a study in order to revise each and every safety and fire prevention regulations adopted under the protection of Act May 9, 1942, No. 158, as amended, subject to as disposed in the eleventh (11) clause, Article 4 of said Act regarding its approval, promulgation and publication. The study prescribed by this section shall also include an evaluation of the operational systems of the Fire Service in order to advise the necessary administrative changes to insure the employment application use of the most modern and effective methods and procedures in such areas and prevention, inspection and extinguishment of fires. The study prescribed by this section shall be concluded within ninety (90) days after this Act takes effect.

The regulations that may be in force as to the date this act takes effect shall continue to be in all their force according to that set forth in this section.

Section 19. This shall take effect immediately after its approval.

# APPENDIX 5

## HOUSE BILL 1012

## AN ACT TO ORDER THE INSTALLATION OF SPRINKLERS AND SMOKE DETECTORS IN HOTELS AND OTHER BUILDINGS

COMMONWEALTH OF PUERTO RICO

10th Legislature
Regular Assembly

Third Session

H.B. 1012
January 12, 1987

Submitted by

Referred to

## AN ACT

To order the installation of sprinklers and smoke detectors in hotels and other buildings in the Commonwealth of Puerto Rico, to authorize the Fire Chief to approve the necessary regulation and to establish penalties.

BE IT ENACTED BY THE LEGISLATURE OF PUERTO RICO

Section 1- The owner or operator of a building exceeding fifty five (55) feet above the lower level of Fire Service cars entrance and that is used as hotel, residence building or for commercial, industrial or governmental purposes will have to require installation of sprinklers. This is in accordance to rules and within the period of time established by the Fire Chief upon the authority of this law and Law No. 158, May 9, 1942, as ammended.

Section 2- The owner or operator of a building with an area used for meetings exceeding 5 thousands (5,000) square feet within a building of twelve thousands (12,000) square feet will need the installation of sprinklers whenever regulations established by Fire Chief may require it in accordance to this law. This officer is authorized to release of compliance with this requirements any space separated from the said area by a construction already certified as fire resistant by the Fire Service.

The owner or operator of a building with a capacity for three hundred (300) persons or more or with an area that has such dimensions will install sprinklers in areas used for meetings as required by regulations established by the Fire Chief in accordance to this law.

According to this section it is considered that a building or part of a building is used for meetings any time that more than fifty (50) persons meet in that area.

Section 3- The owner or operator of a hotel or apartment building with three or more housing units, must install a smoke detector system, according to the rules and within the time limit established by the Fire Chief, in accordance with this law.

Section 4- Any person may request a modification of the requirements established by this law, by submitting a petition to that effect to the Fire Chief. The Fire Chief will celebrate a hearing within the next ninety (90) days after receiving the petition. This official may modify the requirements of this law if it is established that the existing intallations or other alternate methods substantially comply with the purpose of this law and rules in effect.

Section 5- Any person who violates the dispositions of this law or of the approved regulations, will incur in misdemeanor, punishable by a five hundred dollars ($500) fine or imprisionment for a six months term, or both, in the discretion of the Court. Each additional day incurred in the same violation, the infraction will be considered separately and as a different one.

Section 6- Besides the penalty provided by the previous section, the owners or operators of the buildings covered by the dispositions of this law, will be subject to the orders or recourses stipulated by the Fire Chief, in accordance to the powers conferred by Law 158 of May 9, 1942, as amended.

Section 7- This law shall take effect immediately after its approval.

# APPENDIX 6

## PERSONS INTERVIEWED AND ORGANIZATIONS REPRESENTED

## PERSONS INTERVIEWED AND ORGANIZATIONS REPRESENTED

| | |
|---|---|
| Jose Arroyo | Public Service Commission |
| Arnold Benus | President, Puerto Rico Hotel and Tourism Association |
| Luis Biaggi | Planning Board, Engineer |
| Jose E. Carrasquillo | Assistant Chief, Fire Service of Puerto Rico |
| Eliberto Colon | Fire Prevention, Fire Service of Puerto Rico |
| Miguel Colon | General Secretary, General Union of Firemen |
| Carlos Diago | Deputy Director, Tourism Company |
| Miguel Domenech | Executive Director, Tourism Company |
| Jose M. Figueroa | Training Officer |
| Jesus Garcia | Director Explosives Division, Police Department of Puerto Rico |
| Cruz Marcano Garcia | Administration of Regulations and Permits, Engineer |
| Rafael Rivera Gonzalez | V.F. Local 1852 - U.S.W. (Firemen) |
| Isaias Hernandez | Training Executive, Fire Service of Puerto Rico |
| Tommy Kierce | College of Engineers and Surveyors, Public Relations Assessor |
| Dora Lopez | Legal Counsel, Fire Service of Puerto Rico |
| Eduardo Lopez | Fire Prevention Officer, Fire Service of Puerto Rico |
| Felix Marrero | Inspector, Fire Service of Puerto Rico |
| Raul Marrero | College of Engineers and Surveyors, Executive Director |
| Lionel Motta | Administration of Regulations and Permits |

| | |
|---|---|
| Candito Ordiz | Assistant Chief Fire Prevention, Fire Service of Puerto Rico |
| Oscar Pinero | Administration of Regulations and Permits, Engineer |
| Alberto Richa | President, General Contractors Association, Puerto Rico Chapter |
| Baltasar Corrada Del Rio | Mayor of San Juan |
| Aurelio Lopez Rivera | Chief, Fire Service of Puerto Rico |
| Hector B. Rivera | Chief of Training, Fire Service of Puerto Rico |
| Heriberto Lopez Rivera | President, General Union of Firemen |
| Rafael Rodriguez | Attorney, Auto Workers Local 1852 |
| Manuel Rosabal | Electric and Mechanical Contractors |
| Peter W. Sinz | College of Engineers and Surveyors, President, Fire Safety Committee |
| Victor Toro | Director Administrative Service, Fire Service of Puerto Rico |

# APPENDIX 7

## LISTING OF MATERIALS RECEIVED AND REVIEWED BY THE COMMISSION

## MATERIALS RECEIVED AND REVIEWED BY THE COMMISSION

Certification of Plans and Projects, Act No. 135, Approved June 15, 1967.

Regulations and Permits Administration - Creation, Act. No. 76, Approved June 24, 1975.

Regulation for the Certification of Construction Projects, Planning Regulation No. 12, May 26, 1974.

Building Regulation, Planning Regulation No. 7, Amended 1968.

The Act of the Fire Service of Puerto Rico (Chapter 31).

Fire Prevention Regulation, No. 1703, September 13, 1973.

Draft Changes to the Building and Fire Codes, Proposed by the College of Engineers Committee, Peter W. Sinz, Chairman, dated December 30, 1986.

Fire Service Checklist for Plan Review.

Fire Service Equipment Needs. Memorandum from Hector Rivera, Chief, Division of Administration, Fire Service of Puerto Rico, January 23, 1987.

Budgetary Petition - Fiscal Year 1988, Fire Service of Puerto Rico, dated August 14, 1986.

"The Statewide Organizational Design," a contract report for the Fire Service of Puerto Rico, by Synetics, for Management Decisions, Inc., undated.

State of Florida, Public Lodging and Public Food Service Establishments, F.S. 1983, Ch. 509, and rules for implementation (sprinkler regulation for public lodgings).

An Act Requiring the Installation of Automatic Sprinklers in Buildings over 75 Feet in Height, H5842, the Commonwealth of Massachusetts, 1986.

Uniform Fire Code, International Council of Building Officials, International.

Uniform Building Code, International Council of Building Officials, International.

The Life Safety Code, NFPA 101, National Fire Protection Association, 1985.

# APPENDIX 8

## FIRE SAFETY ACTIONS SUGGESTED TO TOURISM COMPANY AND HOTEL ASSOCIATION FOR IMMEDIATE IMPLEMENTATION

The following recommendations are made to the Department of Tourism. The intent is to suggest actions which if taken by the hotel industry and its individual members would help immediately begin to relieve public concerns about fire safety of Puerto Rico Hotels. If accepted and implemented, we are confident that the level of fire safety in hotel occupancies, can be increased dramatically in a very short span and at minimal cost.

These suggestions, are made cognizant of the fact, that additional short term and long range recommendations impacting on Fire Safety will be made by the Commission to Governor Hernández Colón, after an in depth evaluation of the present requirements of existing codes, operational capabilities and designated responsibilities of the various agencies of government.

## RECOMMENDATIONS

I. Actions which may be implemented by the Hotel Association with assistance from the Fire Department.

1. Develop in conjunction with fire officials, an Interim Fire Safety Plan for all hotels pending a comprehensive fire safety plan which will be developed when installation of fire protection systems is completed.
2. Hotel Association to conduct a seminar for all hotel managers and assistant managers on fire safety seminar to be conducted by recognized fire safety consultant in conjunction with fire department officials.
3. Devote a page in "Que Pasa" magazine to Fire and Emergency Safety Tips.
4. Convene a "Hotel Safety Standards Committee": to draft safety standards and insure compliance of standards agreed to by Hotel Association Members.
5. Institute a program of daily fire tips in newspapers.
6. Start spot radio announcements on fire safety.
7. Give strong consideration for instituting a fire watchman program in hotels that have serious structural deficiencies (i.e., inadequate exits, no interior fire alarms, etc.).

II. Actions that may be taken by individual Hotels:

A. Immediate, no cost steps.

1. Implement a fire prevention awareness program for employees emphasizing bad fire hazard practices and the do's and don'ts during fire emergencies.

2. Provide all employees with a fire prevention checklist, to report all fire prevention violations and/or deficiencies in their area of responsibility.

3. Develop and implement a daily self-inspection safety program by hotel managers and maintain a daily log of same.

4. Review and emphasize good housekeeping practices (No blocking of halls, stairs, storage of rubble, combustibles, etc.).

5. Prohibit smoking in all areas that store combustibles, i.e., linen closets, mattress storage, furniture storage, etc.

6. Insure that all ash trays used by guests and employees, in all public and private areas are safety designed and made of non-combustible materials (combination ash trays and waste disposal baskets to be prohibited).

7. Post "No Smoking" signs in all elevator cars.

8. Remove all ash trays from elevator cars.

9. Install floor level signs on all doors on stairway side.

10. Install floor level signs at or in view of all elevator cars to indicate floor level to guests and emergency personnel.

11. Require Fire Safety Guards during all public assemblages; the number to be predicated on the size of assemblage, type of occupancy, and configuration of assembly area.

B. Immediate low cost stop-gap measures

1. Self closing door closers be installed on all doors (includes guest rooms, storage rooms, etc.)

2. Install single station smoke detectors in all guest rooms. This is recommended as a temporary installation which may require replacement.

3. Increase maintenance of and insure operational efficiency of all exit doors.

4. Institute a program of removing and prohibiting the use of flammable decorations in public areas and

commence a program of replacing same with non-combustible and/or properly flameproofed material.

5. Insure that lighting in all public corridors, stairways, and exits are functioning properly (no missing bulbs, open electrical connections, etc.).

# APPENDIX 9

# INSURANCE RATE CREDITS FOR FIRE SPRINKLER SYSTEMS

## INQUIRY AND RESPONSE

[illegible]
SURVEYORS
SETTLING AGENTS

BENJ. ACOSTA, INC.
P.O. BOX 532 - 331 RECINTO SUR, CORNER TETUAN
SAN JUAN, PUERTO RICO 00902

TELEPHONE (809) 724-6305
CABLE: BENACO
ITT TELEX: 3450507

AFTER OFFICE HOURS
(809) 791-0077
791-2110
791-0818

January 27, 1987

Mr. James Stiger
ISO Commercial Risk Services, Inc.
Recinto Sur 331
San Juan, Puerto Rico

Dear Mr. Stiger:

From attached Executive Order of January 13, 1987 you will see that a Commission on Fire Safety has been created by the Hon. Governor of Puerto Rico, Rafael Hernández Colón, Esq.

The Commission would like to know, the following:

1. Are the member insurance companies of that Organization bound by the property insurance rates established by you?

2. What is the average credit allowance percentage-wise on the fire rates for adequately sprinkler-protected:

   (a) Shopping Centers
   (b) Hotels and Conventions Halls
   (c) High Rise Dwellings
   (d) Dwellings
   (e) Industries
   (f) Single Commercial Premises

3. Does that office require that sprinkler plans be submitted to you for approval before the rate credit is granted? Are there any charges to the insured for inspection, examination, recommended corrections and approval of plans to the insured?

As the Commission is working against a limited period of time, I respectfully beg of you to supply us with the answers to above questions as soon as possible.

For the Commission on Fire Safety

Member

**ISO COMMERCIAL RISK SERVICES, INC.**
331 RECINTO SUR STREET P.O. BOX 1333 SAN JUAN, P.R 00902 (809) 723-0000

JAMES R. STIGERS PEREZ
MANAGER

February 2, 1987

Mr. Benjamin Acosta
Benjamin Acosta, Incorporated
P.O. Box 532
San Jaun, Puerto Rico 00902

Dear Mr. Acosta:

In regard to your letter of January, 27, the following is a response to the questions you presented:

1. ISO Commercial Risk Services, Incorporated (CRS) is a non-profit corporation licensed as a rating organization by the Commissioner of Insurance of Puerto Rico. Participation by insurers in CRS is on subscriber or service purchaser basis, and does not constitute membership in the corporation. The nature of CRS' business in Puerto Rico is to: 1) make available to any insurer rating, actuarial, policy form and related services; 2) function as provided or permitted by law as a rating organization. CRS does not require any insurer, as a condition of subscribing for or of purchasing CRS services, to charge those rates or use those rules or forms that are recommended by CRS.

   Relative to the legal and regulatory requirements of insurers, we recommend that the Insurance Commissioner of the Commonwealth of Puerto Rico be consulted directly.

2. The development of rate credits in recognition of installed sprinkler protection in individual properties is dependent on several variables, such as building construction, occupancy, public fire protection, available water supplies and internal protective features.

   We do not have an average credit to quote on the requested occupancies; however, we estimate that the rate credits for recognition of sprinkler protection generally ranges from 20% to 60%.

(Forward)

3a. CRS does not "approve" sprinkler plans. CRS does, however, request that sprinkler plans be available for its review to assure that its rate calculations accurately reflect the design of the sprinkler system. The reviews are for the sole purpose of assisting in the development of a fire insurance rate. The review is not for the purpose of making property loss prevention or life safety recommendations and none are made.

3b. CRS does not charge insureds for its rate making activities as those services are performed solely for the benefit of participating insurers. CRS is financially supported by the insurers who are subscribers and service purchasers of its services.

Very Truly Yours,

Mr. James R. Striger Perez
Operations Center Manager

JSP:dm

# APPENDIX 10

## FIRE SERVICE OFFICERS - EXPERIENCE

## FIRE SERVICE EXPERIENCE OF PUERTO RICO FIRE CHIEFS

| Name | Experience |
|---|---|
| Samuel E. Duncan | |
| 1941-1942 | Army Fire Prevention Officer |
| 1942-1943 | Chief Fire Service |
| Raul Gandara | Fire College |
| | Fire Chief Certificate N.Y.F.D. |
| 1926-1943 | Captain Ponce Fire Department |
| 1943-1971 | Chief, Fire Service |
| Pedro Oscar Schuck | |
| 1938-1941 | Lt. Ponce Fire Department |
| 1941-1951 | Army Fire Chief |
| 1951-1971 | Asst. Chief Fire Service |
| 1971-1976 | Chief, Fire Service |
| Rafael Nedal | |
| 1952-1955 | Air Force Crash Rescue |
| 1955-1957 | District Chief of Ponce |
| 1957-1963 | Training Executive |
| 1963-1967 | District Chief of Ponce |
| 1969-1972 | Training Executive |
| 1972-1976 | Asst. Fire Chief |
| 1976-1977 | Acting Fire Chief |
| 1977-1983 | Asst. Fire Chief |
| Leopoldo Garcia | |
| 1979-1984 | Chief, Fire Service |
| Ruben Rivera | |
| 1982-1984 | Asst. Fire Chief |
| 1984-1985 | Chief, Fire Service |
| Aurelio Lopez | |
| 1985-Present | Chief, Fire Service |
| Assistant Fire Chief | |
| Jose A. Carrasquillo | |
| 1977-1984 | Zone Chief |
| 1984-1985 | Training Executive |
| 1985-Active | Assistant Fire Chief |
| Zone Chief | |
| Edwin Bernal | Ponce |
| 1969-1979 | District Chief II |
| 1979-Active | Zone Chief |

| | |
|---|---|
| Nestor L. Ortiz | Arecibo |
| 1968-1972 | Sergeant (Firemen) |
| 1972-1979 | District Chief II |
| 1979-Active | Zone Chief |
| Dennys Zamora | Humacao |
| 1977-1985 | District Chief I |
| 1985-1986 | District Chief II |
| 1986-Active | Zone Chief |
| Jose M. Burgos | San Juan |
| 1968-1969 | Sergeant (Firemen) |
| 1969-1985 | District Chief II |
| 1985-Active | Zone Chief |

District Chiefs

| | |
|---|---|
| Juan F. Cana | Carolina |
| 1968-1971 | Sergeant (Firemen) |
| 1981-1986 | District Chief I |
| 1986-Active | District Chief II |
| Mesmer Planell | Bayamon |
| 1975-1977 | Sergeant |
| 1977-1983 | District Chief I |
| 1983-Active | District Chief II |
| Julio E. Marrero | Rio Piedras |
| 1975-1977 | Sergeant (Firemen) |
| 1977-1984 | District Chief I |
| 1984-Active | District Chief II |
| Julio Fontanez | Caguas |
| 1975-1976 | Sergeant (Firemen) |
| 1976-1987 | District Chief I |
| 1987-Active | District Chief II |
| Jose M. Ayala | San Juan |
| 1961-1967 | Sergeant (Firemen) |
| 1968-1978 | District Chief I |
| 1978-Active | District Chief II |
| Norberto Toro | Mayaguez |
| Acting | District Chief I |
| Julio Rosado | Ponce |
| Acting | District Chief I |
| Santiago Torres | Aguadilla |
| 1973-1979 | Sergeant (Firemen) |
| 1979-1981 | District Chief I |
| 1981-Active | District Chief II |

| | |
|---|---|
| Luis R. Sierra | Humacao |
| 1975-1981 | Sergeant (Firemen) |
| 1981-1984 | District Chief I |
| 1984-Active | District Chief II |
| Juan Burgos | Guayama |
| 1962-1968 | Corporal-Firemen |
| 1968-1976 | Sergeant (Firemen) |
| 1976-Active | District Chief II |

### Training Division

| | |
|---|---|
| Hector B. Rivera | |
| 1984-Active | Training Executive II |
| Isaias Hernandez | |
| 1983-1984 | Executive II Fire Service |
| 1984-1985 | Assistant Chief |
| 1985-Active | Training Executive |

### Prevention Division

| | |
|---|---|
| Eliberto Colon | |
| 1969 | Fire Prevention Officer I |
| 1969-1986 | Fire Prevention Officer II |
| 1987-Active | Fire Prevention Chief |
| Candido Ortiz | |
| 1977-1980 | Fire Prevention Executive |
| 1980-1985 | Fire Prevention Chief |
| 1985-Active | Fire Prevention Executive |

### Administrative Division

| | |
|---|---|
| Victor M. Toro | |
| 1978-1986 | General Manager and President of Amara, Inc. (Drug Store) |
| 1986-Active | Director of Administrative Services |

# APPENDIX 11

# FIRE SERVICE INFORMATION REQUESTED AND RESPONSE RECEIVED

## THE FOLLOWING INFORMATION WAS REQUESTED OF THE FIRE SERVICE BY THE COMMISSION

| | INFORMATION REQUESTED | RESPONSE |
|---|---|---|
| 1. | Annual Reports 1981-1986 | Not Available |
| 2. | Copy of a Fire Report | Received |
| 3. | Equipment Inventory | |
| | Number of Apparatus - Type, Capacity, Age | Received |
| | Number of Masks and Type | Received |
| | Fire Fighting Equipment-Personal | |
| | Written | |
| 4. | Operational Procedure | |
| | Administrative | Not Received |
| | Fire Ground - Incident Command System (S.C.S.) | Not Available |
| | Inter-agency and Department Coordination | Not Available |
| 5. | Communication Capabilities | |
| | On Apparatus | Yes, All Fire Fighting Apparatus Equipped |
| | In Hd. Qts. | Yes, 1 Base Station |
| | Number of Handi Talkies | 25 |
| 6. | Maintenance Programs | No - Other Municipal Services Provided Maintenance Service |
| | Building | |
| | Apparatus | |
| 7. | Equipment Replacement Policy | Limited - No Long Range Plan |
| 8. | Foam Capability | Limited |
| 9. | Training Programs Available | |
| | a. Entry Level | Yes, 8 Weeks |
| | b. Promotional Co. Officer | None |
| | c. Chief Officer | None |
| | d. Engine Pumps Operator | None |
| | e. Ladder Co. Operator | None |
| | f. Specialized Operational Unit | None |
| | g. HazMat Training | Limited |
| | h. Company On-the-Job Training | None |
| | i. Evaluation Training | Only Entry |
| | j. Fire Prevention | None for Firefighters |
| | k. Inspector | Yes |

| | | |
|---|---|---|
| | l. Apparatus Field Inspection | No |
| | m. First Aid | On Entry |
| | n. Mask Training | On Entry |
| | o. Rope Training | On Entry |
| 10. | Manning Authorized Quota | Received |
| | Chief Officers | Received |
| | Company Officers | Received |
| | Fire Fighter | Received |
| | Fire Prevention Inspectors | Received |
| 11. | Salary Levels of All Ranks | Received |
| 12. | Pre-Requisites for Entry Level | Received |
| 13. | Lateral Entry Permitted | Yes |
| 14. | Organizational Chart | Received |
| 15. | Promotional Opportunities Available | Yes |
| 16. | Response 1st Alarm<br>2nd Alarm<br>and Others | Received |
| 17. | Fire Prevention Bureau<br>Organization<br>Procedures<br>Objective & Goals<br>Supervision Control<br>Follow-Up | Received Verbally |
| 18. | Rules and Regulations for the Uniformed Force | Received<br>Outdated |
| 19. | Tools - List | Not Available |
| 20. | Ladder Co. Duties | Not Available |
| 21. | Manning Levels | None Stated |
| 22. | Duties First Arriving Chief | None Written |
| | Communications Capabilities | Limited |
| 23. | Other Emergency Procedures and Disaster Plan | Provided by Civil Defense |

# APPENDIX II

UNITED STATES DEPARTMENT OF
COMMERCE
NEWS GAITHERSBURG, MD 20899

NATIONAL BUREAU
OF
STANDARDS

FOR IMMEDIATE RELEASE:
March 5, 1987

Jan Kosko
301/975-2762

TN-5605

## BETTER UNDERSTANDING OF FIRE HAZARDS CALLED VITAL TO REDUCING LOSS OF LIFE AND PROPERTY

The United States continues to have one of the worst fire death records in the world because most Americans do not understand the hazards of fire any better "than did the unsuspecting victims of this latest disaster," according to Dr. Jack E. Snell of the Commerce Department's National Bureau of Standards (NBS).

Snell, chief of the NBS Center for Fire Research, was referring to the Dec. 31, 1986, Dupont Plaza Hotel fire, in San Juan, Puerto Rico, which killed 96 people. He testified today on hotel fire safety before the House Subcommittee on Science, Research and Technology.

One of the reasons for the high fire loss in the United States, contends Snell, is because people lack the tools they need to measure fire safety. "How can we tell how well a fire protection system will work, if we don't have the means to measure its performance?", he asked. Another reason, said Snell, is that people lack the needed education and motivation. "One is not likely to avoid a danger he is not aware of or does not comprehend," he said.

Over the last decade, NBS has been developing tools to measure fire risk and fire safety. "These advances have launched a revolution in how fire is thought about, planned for, and confronted," said Snell. The tools include ways to measure whether materials will ignite and burn, and methods to determine the toxic products being produced. They also include ways to predict the outcome of a fire.

As part of the federal team investigating the Puerto Rico hotel fire, NBS experts used these tools to analyze and re-create the behavior and movement of the fire. They estimated that approximately 9 minutes after the fire started, the ballroom "flashed over" involving most of the combustible floor and wall coverings. (Flashover is a phenomenon where fire suddenly spreads from an initial burning object to the whole room. It is caused as hot gases build up near the ceiling of the room and descend downward.) Several minutes later, flames broke through the glass partitions to the casino, where most of the people died, sending a wave of fuel-rich smoke and flames across the room. "This wave probably ignited most of the combustibles in the casino in the next minute," said Snell. "Occupants were hopelessly trapped."

The NBS researchers also applied the same equations and computer models to answer a number of "what if" questions. For example, the researchers looked at what would have happened if sprinklers had been present. A modern, quick response sprinkler located directly above the fire would have gone off about 45 seconds after the fire started, said Snell. On the other hand, a traditional sprinkler head placed about 10 feet away would have activated in about three minutes. "While this is a comparatively long time...an operating sprinkler head probably would have extinguished, or at least controlled, this fire," he said.

Smoke detectors would have operated more quickly. A smoke detector located directly above the fire would have sounded an alarm in about 15 seconds; one as far as 40 feet from the fire would have sounded in about a minute. "Of course, detectors only send alarms. Their worth depends entirely on how they are responded to," added Snell.

The NBS researchers also looked at what would have happened if materials used in the hotel had been more fire resistant. Many building codes would have required that the wall between the south ballroom, where the fire started, and the foyer have at least a one-hour fire resistance. Had this been the case, the fire would not have broken into the foyer, said Snell. Once smoke emerged into the foyer, it moved up the main staircase to the lobby blocking the two doors into and out of the casino.

The researchers also determined that if the partition between the north and south ballrooms had been more substantially constructed, flashover would not have occurred so quickly. In addition, said Snell, if all the ballroom doors had been closed, flashover probably would not have occurred.

Snell said tools such as those used by the NBS scientists and engineers to investigate the Dupont Plaza hotel fire are becoming more practical and are making it possible to develop improved fire safety strategies. For example, computer models will allow hotel and other building managers as well as homeowners to try out strategies such as escape routes, much as pilots use flight simulators to experience inflight hazards. Until recently there wasn't sufficient knowledge about fire to do the same sort of thing.

For the past several years, NBS has been developing "user-friendly" computer models which can predict how fire behaves and the movement of smoke and fire throughout a building. Several of these models are now available. An NBS model known as HAZARD I calculates the hazard to people from a specified fire in a specified building. The prototype model, which will be available soon, can be used to look at a particular design and the effect protection features such as sprinklers or smoke alarms would have on the outcome of the fire. At present, HAZARD I applies only to a small range of single-family residential designs. Future versions will address additional occupancies, such as hotels, and will include a broader range of fire, design, and occupant variables.

Snell said the technology exists to make hotels and homes fire safe. The problem, he said, is that fire safety involves trade-offs among cost, function or comfort, and safety. "Disasters resulted when either the risks of fire were not perceived correctly or trade-offs weren't assessed properly," said Snell. He added that new fire tools "can permit people to evaluate how well various combinations of fire protection technologies will work, to evaluate fire safety trade-offs, and to stimulate and guide the development of more effective and affordable technologies for fire protection."

-30-

NOTE TO EDITORS AND REPORTERS: Copies of Snell's testimony are available from Jan Kosko, Public Information Division, Room A903 Administration Building, National Bureau of Standards, Gaithersburg, Md. 20899, telephone: 301/975-2762.

UNITED STATES DEPARTMENT OF COMMERCE
National Bureau of Standards
Gaithersburg, Maryland 20899

March 1987

Jan Kosko
301/975-2762

## FACT SHEET

## NBS CENTER FOR FIRE RESEARCH

The United States has one of the worst fire loss records in the industrialized world. The National Bureau of Standards (NBS) Center for Fire Research was established in 1974 to provide the scientific and engineering bases needed to reduce these losses and the cost of fire protection.

NBS scientists and engineers conduct research on how fires start and spread, and how they can be detected and suppressed. This research leads to realistic material test methods, cost-effective fire safety design concepts and new methods of fire control and extinguishment.

NBS does not promulgate or enforce standards or regulations. Rather, it provides technical support to voluntary standards and model codes groups, the engineering and design community, the building industry, fire services, and fire protection organizations. It also provides scientifically based recommendations to other government agencies that have fire safety or regulatory responsibility.

Some of the research being conducted at NBS includes studies on the physics and chemistry of fire, flame spread, sprinkler systems, the lethal effects of smoke, and the heat given off by furniture and wall coverings.

Information obtained in this experimental work is used in variety of ways. For instance, results from this research are fed into computer models being developed by NBS to predict fire and smoke movement through a building and the vulnerability of occupants to fire. These models make it possible to duplicate within a limited budget real fire situations. It is far less costly and far more practical to "burn" a room or building using a computer. Several of these NBS-developed models are available and can be used on personal computers.

NBS recently set up a Fire Simulation Laboratory to give those in the fire protection community a chance to learn about the models and obtain "hands on" experience with them.

NBS also sponsors a program of grants for fire research. Approximately 25 grants are awarded to universities and research institutes annually.

- 30 -

## PRESS RELEASE

**CONTACT PERSON:** Edward Wall, Deputy Administrator, U.S. Fire Administration
(Telephone Number: 301-447-1080)

**FOR RELEASE:** Monday, January 12, 1987

## "ORDINARY FIRE" SAY U.S. FIRE ADMINISTRATION OFFICIALS

Clyde Bragdon, Administrator of the United States Fire Adminstration, today announced the return of a special team sent to observe on-site conditions at the fatal Dupont Plaza Hotel fire in Puerto Rico on New Year's Eve. Responding to an invitation from the Bureau of Alcohol, Tobacco and Firearms, a multi-disciplinary team was established by the U.S. Fire Administration. The team included Edward Wall, Deputy Administrator (USFA); Tim May, Chairman of the Arson Mitigation Program at the National Fire Academy; Tom Minnich, Fire Prevention Specialist (USFA); Dr. James Quintiere, Chief, Fire Science and Engineering Division, National Bureau of Standards; and Bud Nelson, Senior Scientist, both from the Center for Fire Research. Explaining the purpose of the team, Bragdon stated "by combining the rich expertise of professional fire fighters and fire research scientists, we were able to obtain an accurate and timely tracking of this fire's course". Bragdon added that "the tremendous work done by the Bureau of Alcohol, Tobacco and Firearms, prior and subsequent to the team's arrival, greatly facilitated the efforts of all agencies involved in the investigation. This was an impressive example of inter-agency cooperation at its finest". Edward Wall, the team's leader, went on to explain highlights of the team's findings.

"People read newspaper accounts and think this was an extraordinary fire. It surely was in terms of the number of casualties, but what the public doesn't realize is how, from a firefighter's perspective, this was a hotel fire that progressed in a predictable manner. The Dupont Plaza was not unique in its design. It was not unique in terms of its construction. But, the Dupont Plaza is an important example of what can happen when an ordinary fire starts in a structure with no detectors, no functioning alarms, and no sprinklers," remarked Wall.

Built in the early 1960's, the hotel was constructed in accordance with contemporary standards of fire resistance. The architectural design reflects a style popular in that period. The hotel's lobby, casino and ballroom were located in the first two stories, while guests were housed in a seventeen story tower. The fire's point of origin has been determined at the ground level in the ballroom. The ballroom can best be described as a general function, conference-type room which could be divided by single free-hanging panels. A portion of the ballroom was being used as storage during the time of the fire. Both the casino and the ballroom had a suspended ceiling creating a large area between the suspended ceiling and the structure's actual ceiling. Three sides of the casino had floor to ceiling windows as did the atrium which connected the ballroom and the casino. The casino had two means of egress (exitways): on the ballroom side, a pair of free-swinging tempered glass doors and a solid-core, inward-opening wood door at the opposite end of the casino.

Between 200 and 250 people were estimated to have been in the casino at the time of the fire, which began between 3:30 and 3:45 p.m. Once smoke was spotted from the glass walls separating the casino from the atrium and ballroom, people began leaving the casino. As the fire grew in intensity and as more people became aware of the fire, investigators have reconstructed that casino occupants rushed to the only available exit -- the wood door located at the far end of the casino. Exit from this door required people within the casino to pull the door inward, which became increasingly difficult as more people congregated at that end of the casino. As people became aware of the difficulties in exiting through this point of egress, people began looking for alternative means of escape and began breaking windows at the rear of the casino. People began jumping from the windows to the ground fifteen feet below.

Investigation revealed that the fire progressed through the ballroom, moving into the atrium, where it was supplied with additional oxygen. Edward Wall reported that team analysts have reconstructed the fire's course at this point and have concluded that gasses, accumulating in the space above the suspended ceiling, contributed to "the fire's ferocious intensity." Once the casino windows were broken and as the fire reached the atrium, it began to quickly move into the casino searching for more oxygen to fuel its continuation. As a result of the broken casino windows, an influx of oxygen created a wall of flame moving through the casino that prevented the escape of many of the casino's occupants. Wall noted that "unlike most hotel fires, the majority of the victims appear to have died as a result of direct flame contact rather than from the effects of smoke inhalation."

The preliminary report of the U.S. Fire Administration demonstrates a strong need for sound fire prevention programs. Clyde Bragdon observed, "The tragedy of San Juan and of every fire is that we know how to prevent most fires from starting and we also know how to stop the fires that start from spreading. The technology and the studies are all there but knowledgeable fire safety practices are not. Patterns of ignorance and lax behavior about fire safety continue. Over and over again we see times when after a tragedy, the public becomes alarmed about the need for fire safety, and then as time goes on, interest wanes and little to nothing is done".

Edward Wall added, "The Dupont Plaza fire shared one unfortunate characteristic with Kentucky's fatal Beverly Hills Supper Club fire several years ago. In both fires important means of escape were impeded by exits which did not allow a free flow of traffic in an emergency setting. And, of course, in any fire the desirable sequence of events is the activation of a sprinkler system which allows suppression of the fire while it is still small." Nonetheless, U.S. Fire Administration officials, citing industry statistics, estimate that as many as 95 percent of the nation's 50,000 hotels do not have complete sprinkler systems. The Agency has long advocated the need for improved measures in fire prevention, detection, and enforcement.

Clyde Bragdon concluded, "It would be reassuring to know that some valuable lessons could be learned from this recent, sad tragedy. The investigation of the Dupont Plaza fire was unprecedented. The coordination of the investigation by the Bureau of Alcohol,Tobacco and Firearms, was so skillful that it enabled the strengths and expertise of all other participating agencies to emerge. In addition, the Bureau created an atmosphere of cooperation and collaboration among these agencies -- an often difficult feat in inter-agency endeavors."

Mr. Bragdon then described the value of the Fire Administration's investigative approach. "For the first time, our agency put together a multi-disciplinary team which pooled the talents of the National Bureau of Standards, Center for Fire Research and those of the U.S. Fire Administration. We found our approach to be so effective that we may decide to retain this team to respond to future fires of this magnitude."

NFPA
Moving Mankind Toward Safety From Fire

NATIONAL
FIRE PROTECTION
ASSOCIATION
INTERNATIONAL

Suite 1210
1110 Vermont Avenue, N.W.
Washington, D.C. 20005
(202) 667-7441
Telex No. 904024 NFPA WSH

January 22, 1987

The Honorable
Doug Walgren
Science, Research and Technology Subcommittee
2319 Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman Walgren:

This folder contains two documents that will be of great interest to you and your constituents. The first is a position paper from the Joint Council of National Fire Service Organizations regarding the programs and objectives of FEMA's U.S. Fire Administration and the National Fire Academy.

The other paper is the initial release of information flowing out of NFPA's investigation of the DuPont Plaza Hotel Fire in San Juan, P.R. This investigation, funded completely by NFPA, is the latest report in a continuing series of such investigations conducted by NFPA for the past 46 years. In recent years our investigations have been conducted by a multi-disciplinary team including scientists from the National Bureau of Standards, structural experts from the Model Building Code organizations as well as our own professional engineering staff investigators.

A complete, competent and useful engineering study of such a complex fire will take a little more time to finish, however, this will give you a a general knowledge of the key elements involved. When the full engineering study is completed it will be made available to you and your committee.

I will contact your office during the week of February 17th to follow up with you and your staff. In the meantime, if there are any comments or questions please feel free to call us at 667-7441. NFPA is here to help create a better understanding of the need for improved fire and life safety for all Americans.

Sincerely,

John C. Gerard/sn

John C. Gerard
Washington Representative

Enclosures

EXECUTIVE OFFICE: BATTERYMARCH PARK, QUINCY, MASSACHUSETTS, U.S.A. 02269 • TELEPHONE (617) 770-3000 • TELEX 200250

The non-profit technical and educational organization: To promote the science and improve the methods of fire protection and prevention; to obtain and circulate information on these subjects and to secure the co-operation of its members and the public in establishing proper safeguards against loss of life and property by fire

NFPA
"Moving Mankind Toward Safety From Fire"

NATIONAL
FIRE PROTECTION
ASSOCIATION
INTERNATIONAL

Fact Sheet

Dupont Plaza Hotel and Casino

96 Fatalities

December 31, 1986

On December 31, 1986, a mid-afternoon fire at the Dupont Plaza Hotel and Casino in San Juan, Puerto Rico, resulted in 96 fatalities and over 140 injuries. An investigation effort is in progress by the National Fire Protection Association to document fire development and loss of life factors. NFPA dispatched an investigation team of four specialists to conduct the study, working in cooperation with the Bureau of Alcohol, Tobacco and Firearms (ATF), and local authorities.

The fire occurred in a non-sprinklered 20-story hotel complex that contained a first-floor ballroom, a second-floor (main entrance level) casino, various mercantile shops, restaurants and conference rooms in addition to 17 guest room floors. Construction included unprotected noncombustible and some combustible construction in the ballroom area; and fire-resistive construction in the casino, lobby area and the high-rise tower. There were no fire detection systems; and there was a local-only, manual fire evacuation alarm system installed in the high-rise tower. There was also a standpipe and hose system in the tower.

At approximately 3:22 P.M., the fire was discovered in a first-floor, unoccupied ballroom at the east end of the complex. Agents from the Bureau of Alcohol, Tobacco and Firearms (ATF) and local authorities determined that the

EXECUTIVE OFFICE: BATTERYMARCH PARK, QUINCY, MASSACHUSETTS, U. S. A. 02269 • TELEPHONE (617) 770-3000 • TELEX 200250

The non-profit technical and educational organization. To promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the co-operation of its members and the public in establishing proper safeguards against loss of life and property by fire.

fire was deliberately set in a large stack of recently delivered guest room furniture, temporarily stored in the ballroom.

Once ignited, the fire developed quickly, involving the stored materials and the combustible interior of the south ballroom including carpeted walls, stacked chairs and a combustible, removable partition separating the south ballroom (room of fire origin) from the adjoining (north) ballroom.

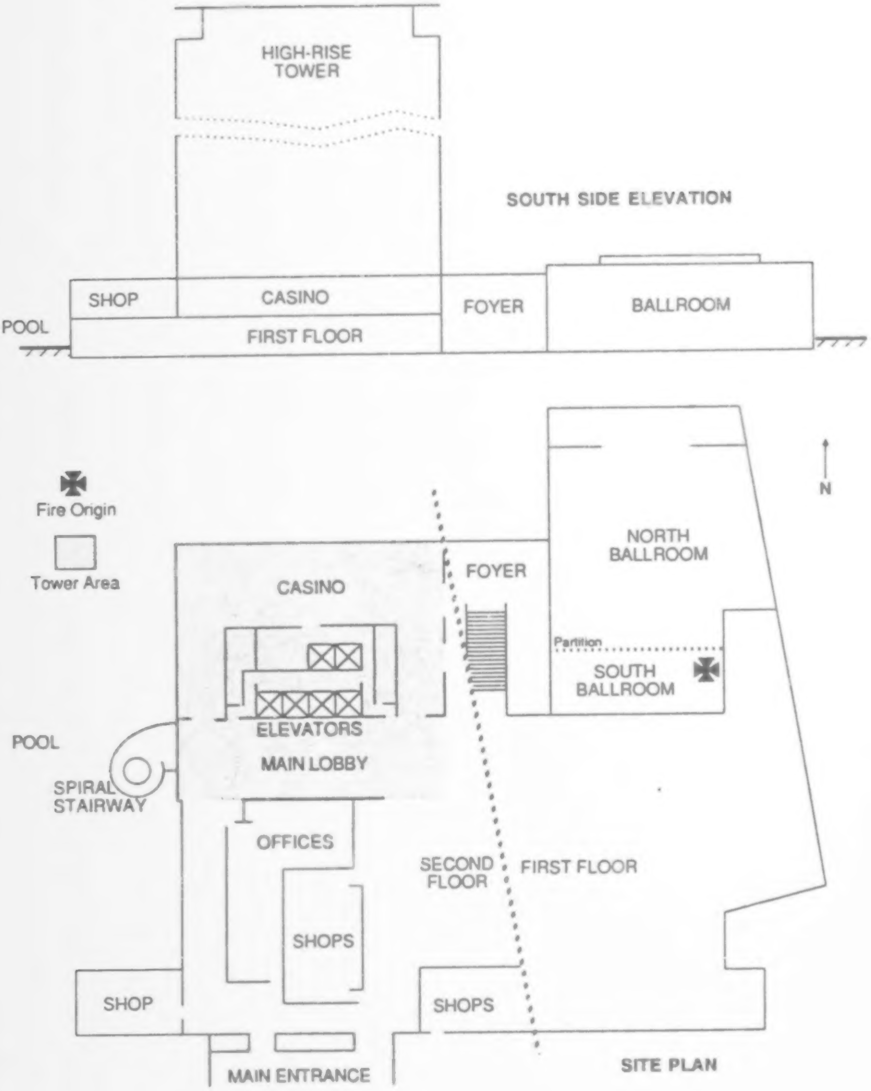
While the south ballroom was approaching full involvement, the fire penetrated the combustible partition, spreading products of combustion to the adjoining ballroom and to a balcony area directly above. Room flashover conditions were reached causing the glass wall of the south ballroom to fail, spreading products of combustion to a foyer connecting the ballroom level (ground floor) to the second floor level.

Occupants on the second floor became aware of the rapidly spreading fire and began to move toward exits. The majority of the casino occupants moved toward the west portion of the casino which led into the main hotel lobby and to an exterior spiral stairway leading to grade. Not all of the casino level occupants were able to safely reach the exit before the flame front vented through the lobby and out the opening to the spiral stairway. When this occurred, the exit path for the remaining occupants of the casino was most likely blocked. Some of the occupants began to break the exterior glass walls of the casino and jump to safety; however, during this process, a fire front moved into the casino as windows adjoining the foyer failed. At some point, before all occupants of the casino had left, the door on the west side of the casino was closed. The door opened inward and required two simultaneous actions to unlatch and open the door.

Once this magnitude of fire had reached the casino level, smoke spread to the high-rise tower by several means including service and passenger elevators, the hotel's HVAC system, toilet exhausts for guest rooms, the exterior of the building, and through stairways connecting the casino level to each guest room floor. Occupants of the high-rise became aware of the fire and many moved to the roof of the building and waited for helicopter rescue while others waited on guest room balconies to be rescued.

The fire department was notified at approximately 3:40 P.M. Because of the severity and magnitude of the fire, and due to the complexity of the rescue problems that confronted fire fighters on their arrival at about 3:45, the fire burned for nearly five hours until finally extinguished. After extinguishment, fire fighters began to locate fatalities, mainly clustered near the west exit of the casino. The majority of the fatalities were located in this area. Other fatalities were located in the hotel lobby area, in a passenger elevator, and one fatality was found in a guest room on the fourth floor.

Investigation and analysis of this tragedy will continue by the NFPA Fire Investigation Team. A full report of the incident will be made available upon completion of the analysis of this incident.


HIGH-RISE TOWER
SOUTH SIDE ELEVATION
SHOP
CASINO
FOYER
BALLROOM
POOL
FIRST FLOOR
Fire Origin
Tower Area
N
NORTH BALLROOM
FOYER
CASINO
Partition
SOUTH BALLROOM
ELEVATORS
MAIN LOBBY
POOL
SPIRAL STAIRWAY
OFFICES
SECOND FLOOR
FIRST FLOOR
SHOPS
SHOP
SHOPS
MAIN ENTRANCE
SITE PLAN

DUPONT PLAZA HOTEL
Not to Scale

## INTRODUCTION

This paper is the reaffirmation of previously developed papers of the Joint Council of National Fire Service Organizations as it related to the United States Fire Administration and the National Fire Academy of the Federal Emergency Management Agency.

The Council is committed to the recommendations of this paper and expect early implementation by FEMA.

The Joint Council considers the Federal Fire Program to have been one of its creations, although it does not claim exclusivity in this respect. Accordingly, the Council is determined to maintain close liaison, as well as continue to support the federal focus on fire as long as it truly serves the public interest.

## TABLE OF CONTENTS

1. GENERAL
   - 1.1 Perceived Relationship of the Fire Programs within FEMA with the Total Fire Protection Community
   - 1.2 Employment Opportunities and Professional Positions
   - 1.3 Review, Recognition, Input
   - 1.4 Codes, Standards and Regulatory Functions
   - 1.5 Program Priorities
2. LEGISLATION
   - 2.1 Assistance
   - 2.2 National Conference
3. NATIONAL FIRE ACADEMY
   - 3.1 Program Objectives
   - 3.2 Program Development and Delivery
   - 3.3 Certification
4. UNITED STATES FIRE ADMINISTRATION
   - 4.1 Firefighter Health and Safety
   - 4.2 Fire Prevention and Arson Control
   - 4.3 Data Collection and Dissemination
5. CENTER FOR FIRE RESEARCH

## 1. GENERAL

### 1.1. Perceived Relationship of the Fire Programs within FEMA with the Total Fire Protection Community.

The Federal Fire Prevention and Control Act, and the legislative history show clearly the continuing intent of Congress that the Federal Fire Program should support, rather than supplant, the efforts of other fire-related entities at the local, state and national levels. Well established and effective programs of both the public and private sectors should not be duplicated, and in fact, should be utilized where possible for provision of services with a minimum of bureaucratic entanglement and expense. Maximum utilization of these existing resources can be the most efficient means for realizing genuine and lasting impact on America's fire problem.

With this in mind, the relationship between the Fire Programs, FEMA and the total fire protection community should be characterized by free and open lines of communication.

As part of the fire community:

a. The Joint Council of National Fire Service Organizations, as the recognized representatives of the nation's fire service, should identify priorities for national fire prevention and control needs and should monitor the documents and operations to assure on-going conformance to those needs.

b. The Joint Council should review the existing program efforts and should recommend priorities for the allocation of existing funds consistent with immediate and long range fire prevention and control needs.

c. The Joint Council is called upon by Congress to testify for funding requests at both authorization and appropriation hearings. In order that such testimony be supportive and pertinent, the Joint Council should be given comprehensive briefings at each stage of the budget process and should, at those junctures, be provided the opportunity for meaningful input and recommendations which might keep budget priorities consistent with fire prevention and control needs as identified by the Council.

d. The fire community, in order to assure continuing relevance of program efforts to recognized needs, should have immediate and unimpeded access to USFA administrative and programmatic leadership and the Superintendent of the NFA, through an appropriate organizational design, without involvement of regional or other hierarchical levels of bureaucracy.

1.2 Employment Opportunities and Professional Positions

A. Personnel allocations for the Fire Programs within FEMA have decreased from when the agency was transferred from Commerce to FEMA. Additional personnel are necessary to effectively manage the existing level of activity let alone handle expansion and growth identified as necessary by the fire service. Consistent with repeated requests of the Joint Council, we once again ask that 8 additional professional staff be immediately assigned to the Field Program Division of NFA and 8 additional professional staff be immediately assigned to the Resident Program Division bringing the total complement of staff under the control of the Superintendent of NFA to a minimum of 55 employees.

In order to assure the quality of employees, existing guidelines for these professional positions should be provided to the Joint Council for review and recommendations. All professional staff positions should be permanent.

B. Genuine efforts should be made to assure that experienced and qualified individuals in the technical and operational fire service are vigorously solicited for employment.

C. Mechanisms exist within the federal system for temporary assignment of personnel from state and local systems to participate in federal program efforts; these opportunities should be widely publicized, and recruitment should be more energetically pursued, within the fire service community.

D. All employment opportunities must be made known to the concerned public, both generally and within fire prevention and control interests in a timely fashion.

1.3 Review, Recognition, Input

It is important that the programs developed receive input in the development stages from the respective fire service audience which they are intended to serve.

National fire service and professional organizations which have a direct interest in any of the programs being developed should participate in planning, development, test delivery and review stages of each project.

## 1.4 Codes, Standards and Regulatory Functions

a. The Federal Fire Prevention and Control Act of 1974 clearly indicated that the fire problem is, and should remain, a local responsibility. Mechanisms are readily available for the development, upgrading and enforcement of codes, regulations, and standards for fire prevention and control; and adequate authority exists at the state and local levels.

b. Federal Fire Programs should concentrate on research programs to support, not supplant, the existing standards development systems.

## 1.5 Program Priorities

America Burning, the report of the National Commission on Fire Prevention and Control and the resultant enabling legislation for a Federal Fire Program along with its legislative history, is the source document that the fire service and Joint Council are using to measure the effectiveness of the Federal Fire Program within FEMA.

In past years and with prior administrations, the Joint Council has provided recommendations in the form of program priority statements for both the USFA and NFA. The adoption and implementation of these recommendations have varied considerably from administration to administration.

The establishment of program priorities for all programs within FEMA relating to fire must be consistent with the goals of America Burning and the enabling legislation, and meet the contemporary needs of both the fire service and the public.

The Joint Council must have meaningful input into the development, evaluation and realignment of new or existing programmatic efforts for fire within FEMA in addition to any evolution or oversight activities of other Federal agencies or Congress.

## 2. LEGISLATION

Congress enacted legislation creating Federal Fire Programs and appropriated start-up funds which are now interpreted as ongoing annual funding levels.

Two major problems exist:

1. Legislation

The enabling legislation was altered by PRP 3 and apparently subsequently altered by FEMA. Unfortunately, no one person or agency has a complete document of authority allowable by legislation or any other rules or regulations. FEMA is requested to provide such a document to the Joint Council within 90 days.

2. Appropriation

The National Commission on Fire Prevention and Control recommended an annual budget of $124,840,000 for the Fire Programs now in FEMA. That figure is over and above funding for the Center for Fire Research.

With the loss of the revenue programs in all agencies of the Federal Government, it is now appropriate that funding for the Federal Fire Programs in FEMA be increased. Upon receipt and explanation of this document, the Joint Council and FEMA fire program officials should consider jointly legislative changes necessary to strengthen the posture of the Fire Program so as to eliminate the annual threat of program elimination.

The program must have a strong and long term legislative mandate so the personnel can carry out the stated mission instead of planning for start-ups and close down.

FEMA fire program officials should work with the Joint Council in assessing the funding needs for the future so the appropriate request can be advanced to Congress.

### 2.1 Assistance

Failure to fully fund entire programs has led to many inconsistencies in the allocation of available dollars. In an effort to concurrently serve all mandates of P. L. 93-498, major gaps have developed as a result of certain programs being only partially funded or recommended for zero funding.

The entire allocation system should be assessed at this time. If existing state and local fire service training and education programs are to be effectively used in combating the national fire problem, realistic percentages of the total dollars should be earmarked for such use.

Meanwhile, the Joint Council must provide the stimulus for the entire fire service to work toward increased funding in all areas to allow full implementation and development of these programs which were identified by America Burning and mandated by Congress.

## 2.2. National Conference

There are already numerous national annual conferences directly related to fire. There are many other national conferences where fire, although not the primary subject, is of relevance. The establishment of the USFA annual conference does not appear to be a cost effective way of increasing the dissemination of information on fire. The Federal Fire Prevention and Control Act of 1974 does not make a USFA fire conference mandatory, and it allows for joint efforts. If the conference is primarily to expose the USFA to the fire community, there are several alternative ways of achieving such exposure. There should be a moratorium on the USFA fire conferences and alternatives should be fully explored, including joint arrangements with the organizations already providing fire conferences.

The USFA and NFA played an important role in the advancement of special focus conferences during the late 70's. At the current time, private sector fire service organizations have adapted their conference to fulfill these and greater needs.

There is no reason at this time for funds to be expended in an annual conference. More progress should be made by strengthening the existing private sector conferences as can be discussed with the Joint Council.

## 3. NATIONAL FIRE ACADEMY

The Joint Council has always advocated the establishment of a National Fire Academy as a core facility for fire training and education. The Council considers this still to be the most important program and funding priority for the Federal Government.

The justification for the Academy has been made several times over, and the need is as great today as it was on the previous occasions.

The Council expects to see the National Fire Academy facility play an increased role in providing training and education that can best be delivered only at a central facility. It is expected to supplement and not replace or compete with existing fire education and training systems in the public and privae sector. It is anticipated that it will deliver programs to all segments of the fire community.

The Council has always maintained the importance and priority of the National Fire Academy in the federal fire focus. In view of this, the Council recommends that the Superintendent of the National Fire Academy report directly to the Director of the Federal Emergency Management Agency.

3.1 Program Objectives

a. The NFA is expected to fulfill the training and education needs of all disciplines associated with fire prevention and control. Priorities for fulfilling the fire service needs should thus most appropriately be established in conjunction with the Joint Council of National Fire Service Organizations.

b. The operational fire service, not only through its respective representatives to the Joint Council, but through direct channels as well, should be provided the oportunity for input to all education and training program initiatives of the NFA.

c. Program content should be primarily concentrated on principles which can be applied and implemented at state and local levels in direct relationship to state and local needs.

d. All NFA programs which involve a training and education effort should be based upon specific behavioral objectives to provide a means for assessing the degree to which programs fulfill their intended functions and meet fire service needs.

e. Programs which can have direct benefit to the many thousands of fire fighters of this nation, aimed at facilitating advanced educational opportunities, improving safety and health considerations and other issues, should receive increased emphasis.

3.2 Program Development and Delivery

Both Resident and Field program divisions of the NFA are involved to some degree in the design, development and delivery of certain training and eduction programs aimed at fulfilling the mandate of P. L. 93-498. With the limited funds available to fulfill the overwhelming needs of the public as well as those involved in providing fire prevention and control, costly duplication of effort should be avoided. The following is recommended to improve the existing relationship between the NFA and those currently involved in providing training and education in the areas of fire prevention and control.

a. When a programmatic need is identified, the NFA should conduct a correlation study of existing state, local, college or association programs for those which best fulfill the identifed need. If programs are found which do fulfill the need, duplication of program development and delivery should not occur.

b. When a need is identified which requires the development of new programs, said development shall include active participation in all stages of the audience for which the program is being developed, and those ultimately responsible for the delivery of said program.

c. The need to pilot test materials at various stages of development is well recognized and accepted. However, once the program is in its final form, a more valid pilot test will occur when the materials are pilot tested by utilizing the instructional resources of existing state, local, college and association training and education delivery systems. These pilot tests should incorporate only a reasonable representative sample of the potential population for which the program is intended and should be conducted in a timely fashion. It should be strongly emphasized that a combination of in-house and in the field pilot test in a restricted period of time will allow for a more rapid revision and completion of program materials; thus assuring their availability to those ultimately responsible for training and education delivery.

d. The minimum software to accompany each course developed by the NFA shall include: instructors' directions; resources required for instruction, course objectives; measurable objectives for student performance; suggested prerequisites for instructors and students; pre and post test; visual aids and student handout material.

e. Course materials for each offering of the NFA are essential to encourage a uniformity of the teaching and learning process. A mechanism must be devised which will ensure the availability of course materials to all fire service organizations and fire training and education agencies.

f. The strengthening of the (TRADE) Training Resource and Data Exchange Program is encouraged.

3.3 Certification

All initiatives of NFA should recognize the objectives of the Professional Qualifications Standards developed under the program established by the Joint Council of National Fire Service Organizations as minimum standards for fire protection personnel, and courses should be developed which are consistent with those standards.

The certification of fire prevention and control personnel is and must remain a peer group process; and NFA should not become involved in that process.

## 4. UNITED STATES FIRE ADMINISTRATION

Continued efforts to zero fund, dismantle or rearrange the United States Fire Administration must cease.

Cooperative efforts between the United States Fire Administration and the National Fire Academy are imperative. The National Fire Academy should be the educational delivery area of the technological advances resulting from the United States Fire Administration's research and development efforts.

The Administrator of the United States Fire Administration must continue to report directly to the Director of FEMA. The USFA should also have a fully functional office in Washington, DC.

The following comments and recommendations are pertinent to the respective divisional components of the USFA.

## 4.1 FIREFIGHTER'S HEALTH AND SAFETY

a. The U.S. Fire Administration must carry out research and development and implement programs which will result in improved protective clothing, equipment and toxic environment detection devices to protect firefighters in fire and hazardous material environments.

b. The USFA should act as a catalyst to the medical communities for the development of protocols for the examination, treatment, and care of firefighter victims of fire and burn incidents.

c. A study to address the psychological problems which firefighters encounter in their everyday duties, as well as major disasters should be undertaken and result in the development of appropriate counseling programs. When the firefighter programs are completed, the psychology of a victim should be undertaken and appropriate programs developed.

## 4.2 FIRE PREVENTION AND ARSON CONTROL

a. Commence efforts immediately to halt the erosion of the fire service authority in the area of codes and ordinances through awareness programs for appointed and elected officials at all levels of government.

b. A comprehensive "Public Education Program" to include at least: demonstration and exemplary programs, targeted training programs, regional education assistance programs and fire educators technical assistance should be implemented.

c. Continue the program to analyze the long-term maintenance and readiness of detectors is needed along with awareness and educational programs to the general population to improve the maintenance and reliability of home smoke detectors.

d. Increase and expand programs to make the public aware that automatic residential sprinkler systems are available at an affordable cost.

e. Promote the use of prototype programs by community groups who volunteer their time in fire prevention programs.

f. Support successful National fire education programs such as the Learn Not To Burn fire education program and other private sector programs.

g. Education in the curriculum grades. Encourage state and local departments of education to mandate fire prevention education in the curriculum of all elementary and secondary grades.

4.2 Continued

h. Continue the distribution of Arson Information Management System (AIMS) to jurisdictions across the country.

i. Support research and development of improved detection techniques and equipment to determine the cause and origin of fires.

j. Develop and implement a protocol for laboratory procedures in the collection and testing of materials from fires.

k. Continue and expand interagency and cooperative agreements between public and private sector agencies and organizations on arson prevention and control, such as arson task forces.

l. Continue delivery of the Juvenile Fire Setter Program.

m. Coordinate the Federal effort with the Fire Service on issues of mutual concern in the areas of fire prevention and arson control.

n. Include smoke detector testing in ongoing fire tests with emphasis on placement, design, and sensitivity of smoke detection equipment.

The goal of these tests is to provide early life safety notification while at the same time reducing the current "needless" alarm problem.

## 4.3 DATA COLLECTION AND DISSEMINATION

A vital and essential mission of the U.S. Administration is the continuation of a valid, competent data system for tracking U.S. fire experience. The most important part of that Federal role should be continued support for the USFA's National Fire Incident Reporting System (NFIRS), the only fire incident data base in the country that provides reasonably detailed information on ignition circumstances for a significant sample of fires of all sizes and kinds by specific property type. NFIRS has become an irreplaceable element in the development of decision-related fire information at all levels of government and in all parts of the private sector. Because NFIRS operates--and must operate--as a network of state and local fire officials, the continued maintenance of a strong national coordination role is necessary.

Successful national coordination of NFIRS can be accomplished through cooperation between USFA and private sector organizations, but there is an essential Federal role for USFA in assuring that strong national coordination exists.

The survival and success of NFIRS requires several components not all of which are in good order today. Data processing support is required to assemble the materials supplied by participating jurisdictions into a national data base in a valid, useable form and in a timely manner. Analysts and coding specialists are needed to provide support for the thousands of local NFIRS participants in dealing with operational questions. Support is needed for the NFIRS network as a network so that system coherence and common practices are maintained.

This is turn requires feedback on findings to supporting jurisdictions. While some of these functions can be delegated to private sources, all must be centrally coordinated if NFIRS is to survice.

Also important is continued Federal dedication to the use of non-USFA data bases and the development of improved methods to integrate all data bases in order to provide the best possible estimates. While NFIRS has unique strengths, it also has gaps and weaknesses that can be addressed through the appropriate use of other data bases and of state-of-the-art statistical methods for synthesizing results from multiple data bases. Some of these other data bases are managed by other Federal agencies, others by private organizations. The best information will emerge in the least confusing form and the lowest cost if all involved organizations cooperate and coordinate their uses of data and analysis methods. The USFA has sometimes tried to go it alone in this area but has in recent years been an active participant in the kinds of joint technical discussions required; this participation should continue.

Finally, a competent national fire data system must be flexible and adaptive, able to take advantage of new modeling and testing capabilities. The Federal government includes many agencies whose statutory responsibilities produce a need for special fire data studies, and so there is an ongoing Federal role in supporting the resources required to produce such data and in shaping the agenda of studies to be done.

## 5.0 FIRE RESEARCH CENTER

The Joint Council continues to support the Center for Fire Research in the National Bureau of Standards. We strongly support continued cooperation between USFA, NFA and CFR in the areas of research, development and technology transfer.

National
League
of
Cities

1301 Pennsylvania Avenue NW
Washington, D.C.
20004
(202) 626-3000

**Officers**

President
Cathy Reynolds
Councilwoman-at-Large, Denver, Colorado

First Vice President
Pamela P. Plumb
Councilor, Portland, Maine

Second Vice President
Terry Goddard
Mayor, Phoenix, Arizona

Immediate Past President
Henry G. Cisneros
Mayor, San Antonio, Texas

Executive Director
Alan Beals

March 12, 1987

The Honorable Doug Walgren
United States House of Represenatives
2241 Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman Walgren:

This letter is written to support reauthorization legislation and continued appropriations for the U.S. Fire Administration. The Fire Administration serves as a central focus for fire-related research and training in the United States.

According to the most recent Census statistics, cities spent $6.7 billion on fire protection in 1984-85; 75 percent of the total expended on this service by state and local governments. Despite this level of effort, the U.S. fire death rate remains one of the highest among the industrialized countries of the world. The total costs imposed by fire annually have been estimated as exceeding $30 billion.

NLC's National Municipal Policy, as adopted by the annual Congress of Cities, supports the U.S. Fire Administration as the focus of Federal fire programs and the National Fire Academy as a central educational facility and provider of training for local fire personnel. We would request that, as you review the authorization or appropriation for this Federal agency, you consider the potential safety and financial return to the citizens of the United States from this modest Federal investment.

Sincerely,

Alan Beals

Alan Beals
Executive Director

**Past Presidents: Tom Bradley,** Mayor, Los Angeles, California • **Ferd L. Harrison,** Mayor, Scotland Neck, North Carolina • **William H. Hudnut, III,** Mayor, Indianapolis, Indiana • **George Latimer,** Mayor, St. Paul, Minnesota • **Henry W. Maier,** Mayor, Milwaukee, Wisconsin • **Jessie M. Rattley,** Mayor, Newport News, Virginia • **John P. Rousakis,** Mayor, Savannah, Georgia • **Charles Royer,** Mayor, Seattle, Washington • **George V. Voinovich,** Mayor, Cleveland, Ohio • **Directors: Sidney J. Barthelemy,** Mayor, New Orleans, Louisiana • **José G. Benavides,** Council Member, Sterling Heights, Michigan • **Richard L. Berkley,** Mayor, Kansas City, Missouri • **Maria A. Berriozábal,** Councilwoman, San Antonio, Texas • **Bob Bolen,** Mayor, Fort Worth, Texas • **Scott A. Burgess,** Executive Director, Alaska Municipal League • **Jon C. Burrell,** Executive Director, Maryland Municipal League • **Mary Davis,** Councilmember, Atlanta, Georgia • **Eugene Cox Dunwody,** Council President, Macon, Georgia • **Stacey A. Garner,** Mayor, Pulaski, Tennessee • **W. Wilson Goode,** Mayor, Philadelphia, Pennsylvania • **E. Arthur Gray,** Mayor, Port Jervis, New York • **Alec Hansen,** Executive Director, Montana League of Cities and Towns • **Marion Humes,** Alderman, Chicago, Illinois • **Karen Humphrey,** Councilmember, Fresno, California • **Steven E. Jeffrey,** Executive Director, Vermont League of Cities and Towns • **Robert E. Johnson,** Executive Director, North Dakota League of Cities • **Joseph A. Leafe,** Mayor, Norfolk, Virginia • **Roland A. Luedtke,** Mayor, Lincoln, Nebraska • **Charles Lyons,** Chairman, Board of Selectmen, Arlington, Massachusetts • **Arthur E. Morris,** Mayor, Lancaster, Pennsylvania • **Bob Overstreet,** Councilmember, Everett, Washington • **Greg Peterson,** Mayor, Pierre, South Dakota • **Joy Picus,** Council Member, Los Angeles, California • **Dana G. Rinehart,** Mayor, Columbus, Ohio • **Steven C. Roberts,** Alderman, St. Louis, Missouri • **Joseph A. Sweat,** Executive Director, Tennessee Municipal League • **Don D. Theobald,** Mayor, Shelbyville, Indiana • **James Weatherby,** Executive Director, Association of Idaho Cities • **Douglas S. Wright,** Mayor, Topeka, Kansas

CB

**INTERNATIONAL ASSOCIATION OF FIRE CHIEFS** • INCORPORATED

1329 18th STREET, N.W. • WASHINGTON, D.C. 20036

AREA CODE 202
833-3420

February 26, 1987

The Honorable Doug Walgren
United States Congressman
Chairman, Science, Research and Technology
Sub Committee
Room 2241
Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman Walgren:

The International Association of Fire Chiefs represents one of the nation's strongest interest in Building and Fire Codes as an organization dedicated to Fire Safety for more than 114 years.

Immediately following the tragic fire at the DuPont Plaza Hotel in San Juan, Puerto Rico, as Chairman of the International Association of Fire Chiefs' Building Codes Committee I went to the site of the incident.

As you well know, 96 people lost their lives in this disaster. From what I was briefly able to ascertain, it is my opinion the loss of those lives was needless and preventable.

Much of the blame falls directly on code violations and failure to use contemporary codes with professional enforcement.

The lack of automatic fire sprinklers in public assembly/hotel occupancy, lack of early warning detection alarm devices, improper means of egress, lack of fire safety planning and training, failure to utilize available fire safety techniques--all these and more contributed to this tragedy.

Following the November 1980 MGM Hotel disaster in Las Vegas, Nevada, I can recall how the country was aroused to recognize the need for fire safety in our buildings. Much was accomplished but as time went on, interest faded and now the attitude of, "It can't happen here " prevails too frequently.

Hopefully in light of this recent tragedy, we can again stimulate the interest to provide occupancies that will afford life safety from unwanted fire for our citizens. National interest in such a program depends highly on the support of the political leadership.

Unfortunately, many of the code violations that I observed in the DuPont Plaza Hotel in Puerto Rico exist today in structures throughout the United States. We read that 95% of our hotels and motels are still not equipped with automatic fire sprinkler systems, many still lack early warning detection devices, others offer a false sense of secuirty by having non-functional or improperly installed fire protection equipment. While the furniture, furnishings and decorations are prone to quickly becoming involved in a fire problem.

Scientific research and industry have provided us with ways and means of reducing the loss of life from fires. In spite of this by failing to act, we continue to hold a world record for fire deaths in the United States.

The International Association of Fire Chiefs would like to work actively with you and your sub committee toward the increased use of quick response automatic fire sprinkler systems, automatic detection early warning devices and the use of inorganic and flame retardant materials for furniture, furnishings and decorations to achieve fire safety.

Our President, Chief Robert H. Ely, our Board, Executive Direcor, Garry L. Briese, and myself as Chairman of this Committee all wish to express our gratitude for your personal interest and the interest of the Science, Research and Technical Sub Committee in achieving fire safety in our country.

As the nation's oldest Fire Officer Organization, we are most willing to work with you to improve the country's fire safety record by reducing the loss of lives from fires.

Please advise us of any way we may assist or contribute.

Thank you for the opportunity to express our opinions and goals for fire safety.

Very truly yours,

Alfred J. Hogan

Alfred J. Hogan P.E.
Chairman, Building Codes Committee

Mobay

Bayer Mobay

**Mobay Corporation**
A Bayer USA INC. Company

Mobay Road
Pittsburgh, PA 15205-9741
Telephone 412/777-2000

March 23, 1987

The Honorable Doug Walgren
U.S House of Representatives
2241 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Walgren:

We at Mobay applaud the focus of your committee's attention on fire safety, particularly with respect to high-rise hotels.

For years, Mobay has conducted in-house research and has helped to finance the research of others aimed at gaining knowledge of the intricacies in large scale fires. Our research has focused also on how specific materials burn; on making materials, particularly synthetics, flame resistant; and in the development of laboratory tests designed to measure the fire hazard risk for materials of construction and in furnishings.

While no two fires are exactly alike their devastating effects can be minimized by early detection and early quenching with water. The use of smoke and fire alarms and sprinklers can save lives and limit property damage.

We strongly support your effort and that of your committee to enact legislation requiring detection equipment and sprinkler systems in hotels. If we can assist you in this, do not hesitate to contact me.

Thank you for initiating action in the Congress on this very critical public safety matter.

Sincerely,

Paul Gemeinhardt

Paul G. Gemeinhardt, Director
Communications and Advocacy
for Chemical Industry Issues

Writer's Direct Dial Number
(412) 777-4875

PGG/tlk

**National Volunteer Fire Council**

**E. James Monihan**
Chairman
45 Sussex Drive
Lewes, Delaware 19958
(302) 645-9064

**Ron C. Miller**
1st Vice Chairman
Box 34
Fairbank, Iowa 50629
(319) 635-2422

**Paul B. Streng**
2nd Vice Chairman
307 West Brooks
Howell, Michigan 48843
(517) 546-1231

**Gus Welter**
Secretary
9944 Hamer Avenue
Bloomington, Minnesota 55420
(612) 881-8114

**Jack Condon**
Treasurer
P.O. Box 337
Dallas, Oregon 97338
(503) 623-8265

March 20, 1987

Representative Doug Walgren
Science Research and Technology Subcommittee
2321 Rayburn House Office Building
Washington, D. C., 20515

Dear Congressman Walgren:

As seems to be an annual event, I solicit the assistance of you and your colleagues on behalf of America's volunteer fire service with reference to the Administration's annual budget. Specifically, we have grave concern with the FY 88 Budget both as firefighters and citizens as it relates to the federal fire programs. I will address the three areas of our concern in order of their potential impact from our viewpoint.

Stipend Program National Fire Academy

This program has been reduced by $822,000, which represents two-thirds of the total with the stated intent of total elimination within the next two years. This reduction and worse elimination will severely damage the programs of this fine institution, and more importantly from our point of view, will make it impossible for the volunteer firefighters across the country to take advantage of these excellent programs.

The assurance that this is not specifically aimed at the Fire Academy, but that the Administration intends to eliminate all Stipend Programs of government educational institutions is of little consolation to us. I submit to you, Congressman, that this institution and it's mission are unlike any other in the federal government system and should be considered as such. We of the volunteer fire service have been given the understanding that we are part of a partnership with us providing protection to the lives and property of our citizens as well as the federal properties and lands located deep in our respective districts, while the government provides assistance of a fine research and training facility and the means to take advantage of its programs. If the Stipend Program is permitted to die, this partnership will dissolve and we will be left with the entire burden.

To further highlight the uniqueness of our situation, I note that in the narrative of FEMA's budget the elimination of this program will "permit state and local governments to share the expense in training their employees". This is interesting, since the major portion of the volunteer fire service bears no direct connection to any state or local government and none of us are any government's employees, so I am not clear on who's going to share this expense. Further compounding this is the fact that Revenue Sharing which has brought some funding through these governmental entities to the volunteer service has now been eliminated. Most jurisdictions have made it clear that this will severely hamper their ability to contribute to our activities.

### United States Fire Administration

This budget has been reduced by 3.62 million dollars with the elimination of all Fire Prevention and Arson Control Programs.

Quite candidly, it is difficult to accept that the authors of the budget even understand the mission of the US Fire Administration. Also, it would be interesting to know what they see as its future mission if these programs are eliminated, since they were mandated in the Fire Prevention and Control Act which established the federal government's fire program.

What I do understand the authors to say, is that the programs and products which the Fire Administration has developed and is producing at this time, including a drive to not only install smoke detectors but to improve their maintenance, to develop and promote the use of fast acting residential sprinklers and numerous initiatives in arson prevention and control are neither noteworthy nor necessary. I further understand these authors to say that the deaths of 6,000 of our citizens each year, the highest rate in the civilized world, is acceptable and that having achieved this level of death rate these programs are no longer necessary.

Mr. Walgren, I submit that these statements are not accurate and further that for this nation, the world's most technologically advanced, to have the world's highest fire incidence and fire death rate is not only unacceptable, but a disgrace which can neither be ignored nor tolerated. These programs have been proven to be effective in reducing both fire incidence and the annual rate of fire deaths, and given the opportunity they can continue to attack [illegible].

If you will recall, sir, in an earlier hearing responding to a question of yours concerning programatic areas, I made the comment that I felt that fire prevention education is the key to combating the fire problem, since the vast majority of those who die in fires are lost before the fire department arrives and in fact a great number of them die before the alarm is even received. This statement is still true and I submit to you, sir, that if we are to affect this unacceptable death toll, we must teach the

American people to better protect themselves and their property against the ravages of fire. If these cuts are permitted to stand, that education will not take place.

CENTER FOR FIRE RESEARCH

I was delighted to learn that the Center for Fire Research was not eliminated in this year's budget as has been the case numerous times in the past, but my delight was short lived. Looking into the matter further, I learned that last year when Congress interceded on our behalf, an agreement was made that $500,000 would be removed from the Center's budget and in return it would not be attacked in future year budgets.

$500,000 was sacrificed, but one wonders then why in this year's budget the Center for Building Technology has been eliminated as an entity and its responsibilities transferred to the Center For Fire Research with no accompanying funding. Not only will this result in a diminution of funding resources, but also a dilution of personnel effort at the Center For Fire Research, in its primary mission of investigating fire behavior and related matters.

I request the support of you and your colleagues in restoring the Center's budget not only to last year's level, but to the level of FY 86, since the agreement that sacrificed $500,000 has not been carried out and further to remove the additional burden of building technology research from the shoulders of the limited number of personnel available in the Center For Fire Research.

In addition to these specific concerns, I also ask your support for continuation of the Rural Community Fire Prevention and Control Program which has done so much to help rural fire departments.

Mr. Walgren, on behalf of myself, the National Volunteer Fire Council and America's 1 1/2 million volunteer firefighters, I sincerely thank you and your colleagues for your unwaivering support of the federal fire programs and of our efforts on their behalf. I must note that turning to our elected officials each year to save these programs would be embarrassing at best if it were not for your forebearance, patience and understanding.

Again, I thank you for your support and if I can be of any assistance, please do not hesitate to contact me.

Yours truly,

James Monihan

E. James Monihan
Chairman

EJM/jm